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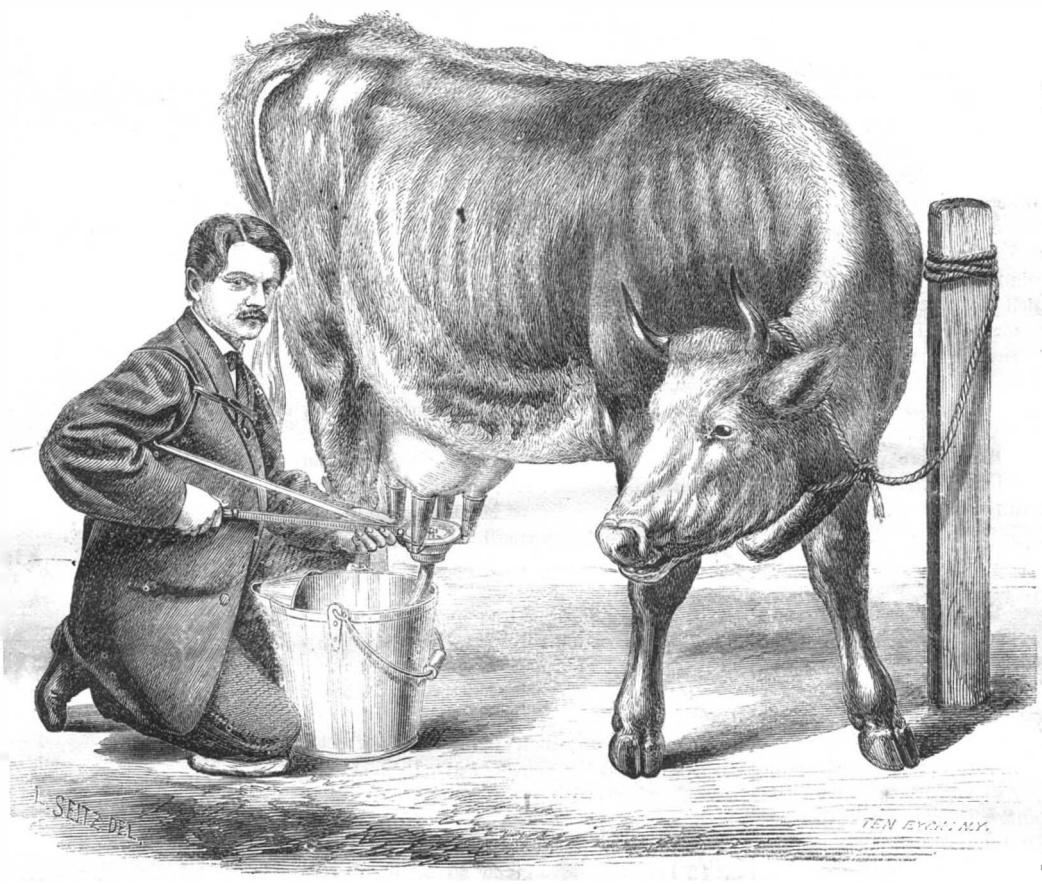
Fruits of Yankee Energy

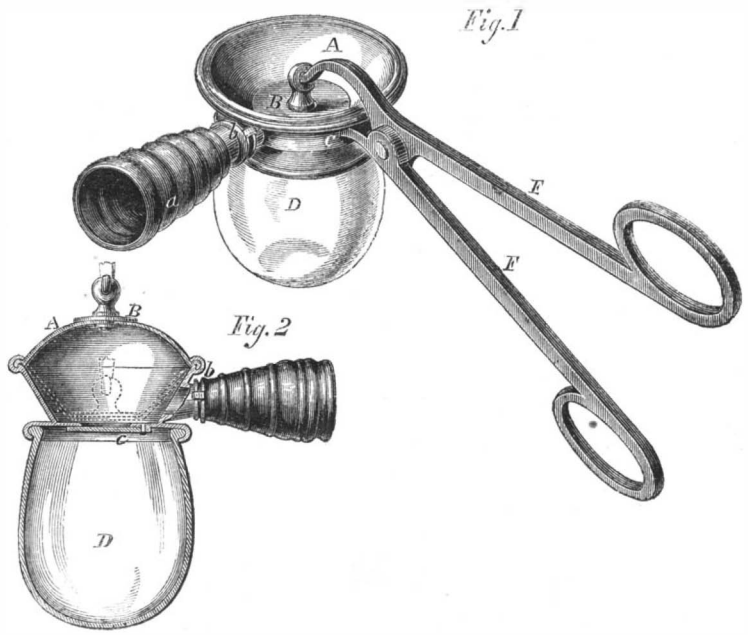
When it was first proposed to accomplish the milking of cows by machinery, the thing was looked upon as an utter impossibility. So far from the public entertaining the proposition seriously, they only laughed at it as being the very acme of absurdity—invention in fact run mad. However, the shrewd projectors of this scheme believed in the old saw, "let them laugh who win," and consequently set about accomplishing their object without the least delay. This invention—published in the SCIENTIFIC AMERICAN, Vol., III (new series), page 4—has been greatly improved since that time, and we think it is now the best, as it is the only machine of its class in use.

The operation of it will be readily understood by referring to our illustration. The four elastic thimbles encircling the teats of the cows-udder connect by apertures at their bases, with the concave metal pan. Attached to this metal pan there is an india-rubber diaphragm or sheet which by operating the levers grasped by the milker gives a remittent action, and produces a partial vacuum in the metal pan in obedience to natural laws; the milk then flows in a stream into the pail beneath, through a valve just over the end of the elastic pipe leading to the same. When the milking is concluded, the operator merely lets go of the handles, and the machine then remains suspended under one arm by the straps over the breast and shoulder, and the milkman is free to go anywhere unembarrassed by the instrument. The whole affair is very light and simple in action, and can be readily taken apart and cleaned. For a view of the internal construction of this invention see the "breast-pump," illustrated on this page; they are alike.

A portion of this invention was patented in this country, through the Scientific American Patent Agency, and also in England, some time ago; but it has recently been improved and other patents are now pending before the U. S. Patent Office. A stock company has been formed in England, with a capital of $100,000, to work this patent; and the British cows will have the satisfaction of being deprived of their lacteal product by a Yankee machine in the shortest possible space of time. Persons who desire further information in regard to the terms of territorial rights should address Kershow & Colvin, patentees and manufacturers, 118 North Broad street, Philadelphia, Pa.



THE CELEBRATED PATENT COW-MILKER.



COLVIN'S BREAST PUMP.

This engraving, which we have previously referred to, represents a breast pump, such as is used for obvious purposes by nurses and the medical faculty. It is upon the same principle as the "cow-milker" illustrated in the preceding engraving. In figure 1, A is the elastic india-rubber diaphragm attached to the metal disk, B, and to the metallic flange C. To the latter is secured the glass chamber, D. A corrugated elastic rubber-pipe, *a*, is coupled to the nozzle, *b*, and is attached at the other extremity to the breast. Fig. 2 shows the pump in section with the diaphragm in dotted lines at the bottom, and also stretched to its fullest extension on top. The small sheet-rubber valve, *c*, is also shown, which closes the connection between the glass chamber and the breast. It will be seen that by working the two handles, F F, in Fig. 1, that a remitting action of the diaphragm is produced which is similar to nature's operations, and which is attended with the result it is desired to attain. This pump is the invention of L. O. Colvin, of Philadelphia. Application for a patent is now pending through the Scientific American Patent Agency. For further information, address Kershow & Colvin, 118 North Broad street, Philadelphia, Pa.

POSTAGE-STAMP CANCELER.—Since the publication of our article on this subject we have been visited with a perfect shower of devices designed to accomplish this result, many of which have shown considerable ingenuity; thus adding another proof that our inventors are equal to any emergency. There seems to be an objection to implements designed to cut or perforate the stamp, owing chiefly to the fact that they would soon get out of order by the constant and rapid use to which they would be exposed. The simplest plan yet suggested, it seems to us, is that of gumming but half the stamp, allowing the other half to be torn off with facility. In a recent article published on page 42 of our present volume, we suggested the practical difficulties that would attend the introduction of the proposed new stamp, though we regard the remedy as quite simple and liable to few objections. We repeat what we said on a former occasion, that time and money would be wasted on any plan unless the Government first adopted it. Whoever is lucky enough to convince Uncle Sam of the value of his device, ought to secure it by Letters Patent.

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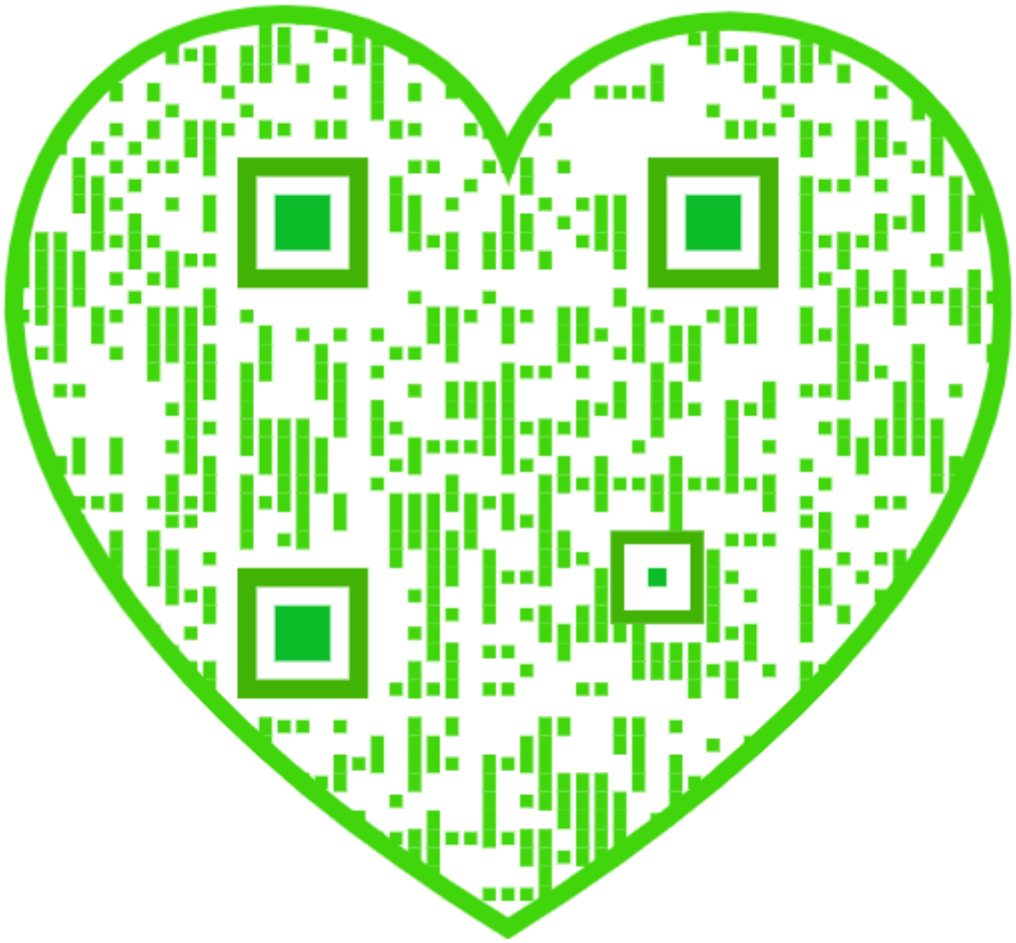

OUR STEAM NAVY---REVIEW OF E. N. DICKERSON'S LETTER TO GIDEON WELLES.

A pamphlet, treating upon the steam navy of this country and the professional capacities of the engineer-in-chief of the same, has been handed to us, and we regret we have not space to reproduce it in these columns. We have carefully read the pamphlet in question, and as it takes somewhat extraordinary ground, we concluded to satisfy ourselves how far the assertions it contains could be substantiated. We may without egotism lay claim to patriotism, certainly as fervent and disinterested as that which Mr. Dickerson boasts of, and if we are really in so poor a plight, as we are said to be, with regard to the engines of our naval steam vessels, there can be no better time than the present to investigate the subject thoroughly. Mr. Dickerson proceeds in a style peculiarly his own, to lash Mr. Isherwood, the Chief Engineer of the Navy, over Mr. Welles's shoulders; ridicules his pretensions and capacity to design steam machinery, and professes to show, by a short and pithy conversation with his (Dickerson's) washerwoman, that Mr. Isherwood lacks common sense. Without going further into this part of the pamphlet, we shall proceed to the grounds of difference, in an engineering point of view, between the two parties under discussion.

Mr. Isherwood has designed some engines for the United States Navy, which work steam expansively but not at as high rates as Mr. Dickerson thinks economical and proper. The engines have been built some time, and have seen some service. There are three classes of them. First, those in the screw gunboats, second, those in the screw sloops-of-war, and lastly, those engines which were put into the side-wheel gunboats lately built, and which are intended for navigating shallow water. These engines, Mr. Dickerson thinks, are from beginning to end, failures. They are, says this oracle, utterly worthless for the purposes for which they were intended, and ought to come out of the ships. The grounds on which these statements are predicated, are certain inherent defects in the original plan which cannot now be altered, except at much expense of time and trouble. The defects are immense areas of surface in the main slide valves, fitted to cylinders which are too small to work steam expansively with economy, and a want of proper apparatus to cut off the steam at any desired point. These bad qualities, according to Mr. Dickerson, are repeated in the sloops, and of course exaggerated as the size of the engines increase.

The side-wheel boats also come in for a share of Mr. Dickerson's displeasure, because they have Stevens's long-toe cut-off, which does not permit of instantaneous alteration.

These are briefly the main points alluded to in the pamphlet, and in support of his assertion, he mentions some instances in point. The *Monongahela*, he says, cut her valves running at the dock so as to be useless, as did also the *Ossippee* while on her way to Fortress Monroe. The *Lackawanna* did the same at the dock, and in addition broke her main brasses. These must be taken as samples of the performance of the engines, says Mr. Dickerson; but he knows, when he makes the assertion, that there are plenty of gunboats, and merchant vessels of all classes, from the *Persia* with her cylinders of 102 inches diameter, down, using slide valves successfully; they having areas which exceed those in our gunboats, and also that they neither cut nor give out in other ways, necessarily. We think some mention ought to be made of the other side of the question; as for instance, the facts that the gunboat *Kinneo*, built in this city at the Morgan Iron-works, has been on duty in the Mississippi and the Gulf, since January, a year ago, with these same slide valves, and has not cost during that time eighty dollars for repairs. The *Katahdin*, built by the same parties, has cost scarcely any more. The gunboats built by the Novelty Iron-works, in this city the *Owasco*, *Aroostook*, and others have, so far as cutting their valves is concerned, never been complained of. We are assured by parties who are in a position to know the facts, that the *Adirondack* up to the time she was lost, performed remarkably well. It would therefore seem plain that the defects alluded to, are not faults which are common to all the vessels, but that they must arise from neglect or carelessness on the part of somebody. Certainly the breaking of the *Lackawanna's* brasses cannot be traced, *directly*, to the large steam surface on the slide valves. We have no disposition to fight the battles of any official, but common justice, no less than common sense, demands that these facts should be made public.

Through several pages Mr. Dickerson pursues Mr. Isherwood with the lash of sarcasm, which, while it may be very funny, does not add much to the force of his argument. One sentence, however, may be briefly alluded to, and it is that one in which Mr. Dickerson accuses Mr. Isherwood of having gone back twenty years, at least, in the science of engineering, by adopting systems which have been discarded as worn out, or impracticable. How far is Mr. Dickerson guilty of the same error? Very recently he built the engine of the steamer *Hu-Quang*; intended to run in Chinese waters, and in pursuance of a plan of his, fitted her out with valves which require immense labor to work by hand, if indeed they are not utterly inoperative in that way. All of our modern beam engines have, for a long time, been fitted with double or balanced puppet valves; they work nearly in *equilibrio* (excuse the Latin, Mr. Dickerson), thereby saving human muscle, and also the wear and tear of machinery. The valves of Mr. Dickerson's "improvement" are, as we are informed, of the old-fashioned single disk or "pot-lid" variety, wherein the whole unbalanced pressure of the steam comes upon the top of them. This he thinks is a better valve than the balanced one, because it saves steam room and is not so liable to leak.

The balanced puppet valve can be worked with one hand by a moderately strong man, but the single valve, when of any size, is inoperative, when disconnected from the eccentrics, except by severe labor on the part of the engineers. Mr. Dickerson lessens their labor by employing a small auxiliary engine to do what could be effected by one hand with proper valves. The *Hu-Quang's* engine is fitted with a cut-off, on Dickerson & Sickles patent; she was sent out to China, and is quoted in Mr. Dickerson's pamphlet as a specimen of American engineering skill. Yet more: Mr. Paul S. Forbes, of this city, lately built a steamer called the *Kiang-Tse*, and fitted her with a beam engine of fifty-inch cylinder and ten feet stroke. Desiring to test the merits of Mr. Dickerson's cut-off in comparison with one constructed by another gentleman in this city, he caused both of them to be affixed to his engine, side by side. Mr. Dickerson's cut-off is said to have given extraordinary results in the trial, and the steamer went to China with it operating the engine. On arriving there, however, the engineer, Mr. Charles Bernard, became satisfied, after experimenting, that the discarded one, still remaining on the engine, was the best, and Mr. Dickerson's improvement was therefore removed and, at the last we heard, had not been replaced.

It is much to be regretted that the philosophic washerwoman, with whom Mr. Dickerson's advises, was absent on this occasion: doubtless she might have devised some method to prevent the removal of the "*improvements*." Again; the same gentleman in order to substantiate his assertion, and prove the soundness of his hypothesis, offered to bet, on the occasion of the trial of a new engine at the Morgan Works, that the balanced puppet valve would leak steam to the amount of the boiler pressure so as to fill the cylinder in 30 seconds. This statement being very much doubted by other engineers present, an experiment was made to test it. The engine was stopped, but as there were no means at hand of prying the engine off, if she had been caught on the center, the cranks were run on the half center so that only half the cylinder remained to be filled with steam instead of all of it, thus giving Mr. Dickerson an important advantage. The bottom of the cylinder was last in connection with the boiler; the other end therefore must have been exhausted, or partially so of vapor. At all events the indicator was connected with the upper end of the cylinder, and showed two pounds below the atmospheric pressure. At the expiration of four minutes, the indicator exhibited a pressure of three-fourths of a pound less, this left the pressure in the cylinder still $1\frac{1}{4}$ pounds below that of the atmosphere. Even this result might have been attributed to the fact of leakage through the standing bolts, through the tallow cock in the cylinder head, or, an equalization from the other side of the piston, as it was new and loosely packed. Upon witnessing the demolition of his theory, Mr. Dickerson left, declaring that these puppet valves were the tightest he had ever seen.

Let us dismiss this subject and consider the relative performances of some steam vessels outside of the navy, as Mr. Dickerson sets the example by comparing the *Eagle* to the gunboats in point of power and economy. The log of the *Hu Quang* shows that she burnt on an average $23\frac{1}{3}$ tuns of coal per day. The *Hu Quang* is a very fine model, was built by Henry Steers, and has an engine of 76 inches in diameter of cylinder, and 12 feet stroke of piston; she is 275 feet long, and is 36 feet wide over hull. She drew, on leaving this port, 9 feet 5 inches of water on an even keel. Now the *Bienville*, a steamship designed under the direction of Mr. Herman Livingston, for the trade between this port and New Orleans, is a vessel 250 feet in length, 34 feet in width, has 26 feet depth of hold, and draws 14 feet of water. The *Bienville* has a cylinder of 65 inches diameter and a stroke of 12 feet, run by two American flue boilers; she draws nearly five feet more water than the *Hu Quang*, is very nearly the counterpart of the celebrated *Eagle*, and yet she has run upward of 350 miles per day, burning between twenty and thirty tuns of coal in so doing. She has a smaller cylinder than either of Mr. Dickerson's vessels, and, therefore, by his own admission, cannot use steam so advantageously, and yet the results obtained are better, and can be proved so beyond all cavil. The laundress is requested to give this matter attention.

We might multiply instances which would go to prove that the writer of the pamphlet is not infallible, and has his little errors in common with the rest of humanity. He makes use of terms throughout his pamphlet, in reference to boilers and condensers in the naval service, which do not belong to the machinery in question. In the new gunboats there are no Montgomery boilers, nor are there any Pirrson's condensers; the boilers are built on Daniel B. Martin's plan, for which he obtained Letters Patent from the Government, and for the adoption of which he doubtless receives compensation. So also with the condensers, the patents belong to William Sewell, Esq. Whether they are infringements of Pirrson's patent, as is asserted, or not, has nothing to do with the question at issue.

Perhaps if Mr. Dickerson could have obtained control of the new gun vessels, as he did of the *Pensacola*, and spend the Government's time, money, fuel, and stores generally, in tedious experiments, all would have been well. Or, if he could have got single-disk valves into the side-wheel gunboats, have fitted them with dash-pots and auxiliary engines to work the valves when unconnected, we should have lost an opportunity of becoming acquainted with the fervency of his patriotism.

Attachment to Carpenters' Jointers.

A correspondent, Mr. J. S. Dutton, of Jaffrey, N. H., suggests that carpenters should attach a guide to their long jointers, so that the frequent use of the try-square may be avoided. This he thinks (and we agree with him) will much facilitate operations, as the workman can rely upon the guide, where before he depended wholly upon his skill in securing a square face. "The guide should be made," says our correspondent, "in the following manner:—Take a strip of hard wood, about two inches wide, 1 inch thick, and 3 inches longer than the jointer; joint this piece true, and fit one edge of it to the face of the jointer near the left hand side; it will cover about $\frac{1}{3}$ of the face. This is the guide; in this position it must be fastened to the jointer, but so that it can be easily and quickly removed. One of the most simple modes of fastening is this: take two pieces of wire, each about three inches long and $\frac{3}{16}$ths of an inch in diameter, and fit these firmly into the edge of the strip, one near each end, leaving about one half the length of the wires projecting outward. Make two corresponding holes in the face of the plane for these wire pins to enter; let the guide be well and tightly fitted at right angles with the face of the jointer, and project $1\frac{1}{2}$ inches beyond it at either end, to facilitate its removal. By this mode of fastening the guide can be removed or replaced in a few seconds of time, and no injury results to the plane."

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The Transportation of Disabled Soldiers.

The bark *Fenelon* arrived at this port on the 12th inst., from New Orleans, having left that port on the 10th of December last. After knocking about in the Atlantic for *only* four weeks, she at length arrived as above stated. It will hardly be credited, when known, that 160 sick and disabled soldiers were put on board this vessel and furnished with "transportation" to their homes. These men were subjected to such hardships, as regards unfit accommodations and disgusting food, that twelve or more out of the whole number died on the passage home. The ship had pig iron as ballast, and these bars furnished convenient weights, which were attached to the feet of the dead men when they were slid over the vessel's side into the deep! The crew of the vessel consisted of eight men, all told, when she ought to have had at least fifteen to handle her properly. The food was rusty and rotten bacon, so *tender* with age that the finger could be pushed through it in any part very easily. This stuff, with some beans occasionally, and biscuits—literally unleavened bread made of flour and water—were the stores served out to men who were, many of them, unable to stand, from chronic diarrhea, fever and ague, and all diseases incidental to and aggravated by exposure. The families of these men, such of them as reached home alive, will long have cause to remember the barbarity of the officials at New Orleans, who consigned our brave soldiers to ships unfit to carry cattle in. The captain of the *Fenelon* was a kind-hearted man, we believe, and did all he could to alleviate the men's sufferings.

The Importance of One Mile.

By constructing a canal about three-fourths of a mile in length, from Big Stone Lake to Lake Traver, steamboats from St. Paul could navigate both the Minnesota river and the Red river of the north to Lake Winnipeg, a distance of seven hundred miles! The country traversed by these rivers is surpassingly fertile, and capable of sustaining a dense population. Lake Winnipeg is larger than Lake Ontario, and receives the Sas-katch-a-wan river from the west. The Sas-katch-a-wan river is navigable to a point (Edmonton House) near the Rocky Mountains, seven hundred miles west of Lake Winnipeg, and only one hundred and fifty miles east of the celebrated gold diggings on Frazer river, in British Columbia. The digging of that one mile of canal would, therefore, enable a steamboat at New Orleans to pass into Lake Winnipeg, and from thence to Edmonton House, some five thousand miles! A bill has been introduced into the Senate, which makes provision for the building of the canal. Probably in the world there cannot be found a spot across which the digging of so short a canal would effect a result so prodigious. And, what is almost equally remarkable, the ground between the two lakes is so low and so level that it is said the water flows in times of freshets from one to the other.

Affairs in Richmond.

The effect of Gen. Carter's operations in Eastern Tennessee has been (says the Richmond *Examiner* of the 4th ult.) an unexampled rise in sugars and molasses. The former commodity is at present retailed at only $1 10 per pound, while the latter commands $8 per gallon. The journal quoted makes no secret of attributing the advance in price to General Carter's operations. The evil does not stop here, however; although to some extent the circumstances alluded to must affect the price of the staff-of-life and other provisions, it is not in wailing over these unimportant things that the Richmond papers waste their ink. Not they. Whisky is their theme, and the price of it is a source of the greatest uneasiness. The market is quoted as affording only the vilest whisky, which before the war a gentleman would not give his negroes; this delectable article is eagerly sought for by the "chivalry" at prices ranging from $25 to $30 per gallon.

THE "IRONSIDES."—The *Ironsides* is said to be a good sea-going vessel, and the press of the country eulogized her performances very highly on the occasion of her trial trip. How is it that she was not sent round Cape Hatteras in the place of the *Monitor?* It strikes us that this would have been an excellent test of her qualities.

Another Testimonial.

We beg to call the attention of persons who are about to apply for Letters Patent to the annexed letter received at this office a few days ago :—

MESSRS. MUNN & CO.:—I was no less surprised than gratified upon receipt of your favor of the 5th inst., notifying me that my application for a patent on a Lamp Burner had been successful. It is less than four weeks since the application was made, and you have now anticipated my most earnest expectations by at least three weeks. By what *hocus pocus* you have thus "flanked" the slow routine of the Patent Office, and avoided the shoals and quicksands of "interferences," "infringements," and other delays and vexations to which inventors are heirs, is a mystery to me, through the obscurity of which, however, I here tender you my thanks, for your promptness. HOMER WRIGHT.

No. 8 Grand street, Pittsburg, Pa., Jan. 8, 1863.

Some weeks ago we had occasion to complain of the excessively long delay which the examiner in the "lamp" department of the Patent Office permitted cases to remain before giving them attention. We are happy to accord to him the credit of having this class of cases well examined up at present; and to those who have deferred applying for patents in consequence of past delays in this department, we advise them to bring forward their inventions and apply for Letters Patent immediately, assuring them that their cases shall receive early attention at the hands of the Patent Office.

The French Iron-clad, "Normandie."

La Normandie is here, the first iron-clad frigate that has ever been in these waters, and I have been on board of her to admire her great strength and make a note of all I might see. She came from the Bay of Sacrificios in four days, which is excellent time, and proves her to be a good sea-going vessel. Her shape is elliptical, being sharply pointed at either end. She is not at all what might be considered handsome, but quite otherwise in appearance. She carries eight guns on her upper and twenty-eight on her lower deck, each of which is shaped like a columbiad, though I should think none of them were of larger caliber than sixty-eight pounders. Each of her six decks is heavily plated on the under part, and considered bomb-proof. During her stay at Vera Cruz her crew suffered terribly from yellow-fever. She went there with six hundred and fifty seamen and came away with only three hundred—leaving three hundred and fifty in their graves or in hospital. Her loss in officers was eight, including her captain, —M. de Russell—one of the most distinguished men in the navy of France. He had discharged important commissions in the Red Sea and other parts of the world; and, when the steamship *Great Eastern* was making such a "noise," he was sent to witness her trial trip, of which he made a minute and luminous report.—*Letter from Cuba.*

Warming and Ventilating of Churches.

To warm and ventilate has ever been a great difficulty, because the two seem incompatible. But, as regards churches, the difficulty is not so great; because the church is not, or at least ought not to be, occupied by the congregation more than two hours. To warm is the main question; to ventilate is easy. The church should not be warmed by stoves inside the church, but by some apparatus that would diffuse warmth over the whole building, and of sufficient power to raise the temperature to 62 degrees. The doors should be double, about six or ten feet apart, with springs; so that when the inner door is open the outer door shall be shut, thus keeping out a great rush of cold air, upon the principle of lock-gates, keeping back the main body of the stream. All the windows should be close; but the church should be lofty, so that the foul air that would accumulate during two hours should not be sufficient to be offensive; and from the roof there should be means of clearing off the bad air between the two services. By this means warmth would be secured, draughts prevented, and the ventilation would be sufficient.

CHANGING THE COURSE OF THE MISSISSIPPI RIVER.—The Mississippi river is now rising; this is favorable for the success of the up-river movement. The *Delta* intimates that "the rebels of Vicksburgh are alarmed, lest nature complete the work began by Brigadier General Thomas Williams, of widening and deepening the 'cut' made by him last fall, so as to obviate the necessity of shipping passing Vicksburgh. We have no doubt that before March next, vessels of all classes will be able to pass through 'Williams's Cut,' and that the course of the Mississippi river will be changed for all time. What will Vicksburgh do then, when she finds herself four miles from navigable water?"—*Boston Traveler.*

A Lecture on the Life and Times of Lord Bacon.

Mr. Henry C. Kinney, of this city, is engaged in delivering a lecture in this city upon the life, times, writings and philosophy of Lord Bacon, which is attracting considerable attention. Few persons have the leisure to read through all the voluminous works of that great man; therefore, such a lecture as Mr. Kinney has prepared is not only a rich intellectual treat, but it supplies, in a popular form, a great amount of useful information concerning Lord Bacon, which hundreds of the people desire to know.

SKATING.—The skating, this season, is said to be superb almost everywhere, and of course accidents and incidents occasioned by the sport are numerous. But the funniest story is that told by the Newburyport *Herald*, of a man in that place who was so enjoyed in the pastime that he forgot to go and get married, keeping his affianced waiting a long while at the clergyman's, and it was not till he had been called again and again that he could be reached and reminded of his engagement. "There!" said he, "I had forgotten all about that business, but I'll be there in a moment;" and up he came to fulfill his promises.

THE COAL TRADE.—The Philadelphia *Ledger* says that the annual tables of the coal trade for the year 1862 show that it amounted to 8,295,472 tuns, of which 7,481,718 were of anthracite coal. All the coal except 300,000 tuns sent inland was destined for the seaboard. Taking the anthracite at $4 per tun, the value of this single product of Pennsylvania reaches nearly thirty millions of dollars for the year. Schuylkill county sent 2,925,000 tuns to market, an increase of 336,673.

CATCHING RABBITS.—Take a box tolerably large, cut a hole on the edge of the box, and fasten inside the hole a piece of tin or sheet iron by a rod on two staples, so that when the box is turned on the ground on its mouth, the piece of tin hangs from the top of the inside; the tin is kept up by a small piece of stick. When the rabbit enters the tin falls and the rabbit is left inside. It needs no bait, you can't keep rabbits out of a hole.

Magazines and other Publications Received.

THE ECLECTIC MAGAZINE. Published by W. H. Bidwell, 5 Beekman street, New York.

We have received the *Eclectic Magazine* for December. It contains, as usual, condensations of the best matter published in the several leading magazines of the day; these are compiled with care and not only form a volume useful for reference alike to the scholar and historian, but furnish the means of so beguiling the long winter evenings that they will pass in a profitable manner.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston.

When the *Atlantic* was first issued, some years since, it was thought to be the organ of an exclusive set of *literateurs* to whose presence it was extremely difficult to gain access, but as it grew older and its scope and intentions became better known, its readers rapidly increased until it is now regarded as an oracle upon all matters appertaining to the higher walks of *belles lettres*. Among the other instructive and entertaining papers, this month, is one upon "Iron-clad Ships and Ordnance," which we have carefully read and found to present an amount of information upon this subject which is very valuable. The writer, Mr. A. H. Holley, is well known in this city as a practical man and an able writer upon mechanical subjects.

ASTRONOMICAL AND METEOROLOGICAL OBSERVATIONS MADE AT THE UNITED STATES NAVAL OBSERVATORY. Commodore J. M. Gillis, Superintendent.

This is a large quarto, volume, containing tables of the apparent right ascensions of the several planets, as well as also the apparent declinations which were observed. There are a number of tables for computing parallax and the operations and results of the scientific apparatus used at the Observatory, together with a full report of the physical aspects of the comet of 1862. The work is issued by Government and is a handsome specimen of the art-typographic.

THE AMERICAN SHARP-SHOOTER. Published by the author, Daniel Wood, Rochester, N. Y.

We have received from the author a small pamphlet upon this subject, which seems to combine practical information with a scientific knowledge of the subject, in such a manner that it may be readily comprehended by every one. There are a number of rules given for rifle and cannon practice; by following these the tyro may soon become an adept. This little work, the author says, should be in the hands of every one interested in this subject, and we can cordially re-echo this expression of his opinion. For information in regard to prices, &c., see advertisement on page 30

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STORMS.

(Continued from page 36.)

Tremendous revolving storms frequently originate in the region of the West Indies and follow the Gulf Stream with precision, sweeping along with the direction of its current through its entire length, while, at the same time, calm and fair weather prevails immediately upon either side. This is shown by Professor's Maury having taken the evidence from scores of log-books of ships scattered over the whole region at the time. The air over the Gulf Stream must receive an extra amount of heat from its waters; this heated air is what the whirlwind feeds upon. Says Maury's "Physical Geography of the Sea," section 943:—"The fact that the hurricanes prefer to place their feet in warm water, and that in all seas where they prevail, warm settled currents are also found, causes us to suspect that there is a certain relation between hurricanes and the warm currents."

There are upon the face of the earth three great currents of heated water—the American Gulf Stream, the Chinese or Japan Current and the Indian Ocean Current; this last setting toward the south pole. They are all of them known to be the nurseries of the most violent rotary storms. The Gulf Stream has its hurricanes, the Chinese Current its typhoons, and the Indian Current its cyclones; each of these streams is but a fair type of the others, being varied a little by secondary causes only, and these storms, attending each, are the same phenomena existing under different names. The burning sands of large deserts and plains covered with little vegetation also engender and impart to the atmosphere, like heated currents of water, an extra amount of heat; they are also remarkable as like regions, for rotating storms. The sand-pillar and land-spout are attendant phenomena of such storms, as the water-spout is of the marine species.

The Baron Von Humboldt, in his "Aspects of Nature," says:—"When, under the vertical rays of the never-clouded sun, the carbonized turfy covering falls into dust, the indurated soil cracks asunder as if from the shock of an earthquake. If, at such times, two opposing currents of air, whose conflict produces a rotary motion, come in contact with the soil, the plain assumes a strange and singular aspect. Like conical-shaped clouds, the points of which descend to the earth, the sand rises through the rarefied air on the electrically-charged center of the whirling current, resembling the loud water-spout, dreaded by the experienced mariner. The lowering sky sheds a dim, almost straw-colored light on the desolate plain. The horizon draws suddenly nearer, the steppe seems to contract, and with it the heart of the wanderer. The hot, dusty particles which fill the air increase its suffocating heat, and the east wind, blowing over the long-heated soil, brings with it no refreshment, but rather a still more burning glow. The pools which the yellow, fading branches the fan-palm had protected from evaporation, now radually disappear. As in the icy North the animals become torpid with cold, so here, under the influence of the parching drought, the crocodile and the boa become motionless and fall asleep, deeply buried in the dry mud."

Maury says:—"At the time of the vernal equinox, the valley of the lower Orinoco is in its dry season—everything is parched up with the drought; the pools are dry, and the marshes and plains become arid wastes. All vegetation has ceased; the great serpents and reptiles have buried themselves for hibernation; the hum of insect life is hushed, and the stillness of death reigns through the valley. Under these circumstances, the light breeze, raising dust from lakes that are dried up and lifting motes from the brown savannas, will bear them away like clouds in the air. This is the period of the year when the surface of the earth in this region, strewed with impalpable and feather-light remains of animal and vegetable organisms, is swept over by whirlwinds, gales, and tornadoes of terrific force; this is the period for the general atmospheric disturbances which have made characteristic the equinoxes. Do not these conditions appear sufficient to afford the 'rain dust' for the spring showers?"

By what other process so plausible as this theory of the whirlwind, could the Ehrenberg infusoria of the Orinoco be carried to such a hight as to be conveyed by the upper trade wind current to North Africa and Europe?

As adding strength to this theory, I will quote what "Smith's Astronomy" says of the spots on the sun:—"Astronomers do not agree, in all respects, as to the cause of the spots on the sun. From the facts already known, the following appears to be the most rational view of the subject: the body of the sun, which is opake, is surrounded by a transparent atmosphere, in which float two strata of luminous clouds; the lower stratum being more dense and opake, and less luminous than the upper; while the latter, by its brilliancy, furnishes the greater portion of the intense light of the sun. Above the upper stratum, the transparent atmosphere extends to a great hight. The agency by which the light and heat of the sun are generated is not known. The only agent of which we know, that presents analogous phenomena, is electricity. The northern lights are supposed to exhibit, in a feeble manner, an action similar to the luminous strata of the sun. The polar regions of the sun are tranquil, and the equatorial comparatively so; but the surface on each side of the equator, from 15° to 25° therefrom, is in a state of constant and violent agitation. It is in this disturbed region that the spots are seen; no spot ever occuring further than about 30° from the equator. The spots, besides revolving with the sun, are found to have a motion from the equator toward the poles, and when they arrive at the comparatively calm region, they gradually disappear. Sometimes they close up with great rapidity, at others they appear to be suddenly broken into fragments and dispersed. Bright spots and streaks, called faculæ, apparently caused by waves in the luminous portion of the atmosphere, also appear on various parts of the disc, but are seen most distinctly near the margin. In the places where spots appear, faculæ are usually seen on the day previous to their breaking out.

"But what causes the agitation of the sun's atmosphere, which is so great as frequently to burst open the luminous strata? Astronomers, at different times, have suggested various causes for the sun's spots, such as jets of gas issuing from the sun and decomposing the luminous clouds; high mountains, extending through the luminous strata; volcanoes, sending forth ashes, smoke, &c.; to say nothing of exploded theories of an older date, such as ashes, scoria, &c., on the surface of the melted, burning mass; or bodies very near the sun, revolving round it. But if we are permitted to reason from what takes place on the earth, we would say that a close analogy exists between the phenomena observed in in our atmosphere and in that of the sun. On the earth the heat of the torrid zone causes the air to expand and rise, causing currents in the lower part of the atmosphere toward the equator, and in the upper part of the atmosphere currents toward the poles. The turning of the earth on its axis causes the under currents to take a westerly direction, while the upper currents sweep in a curve, westerly first, then toward the poles, and finally eastward. The principal disturbance of the atmosphere caused by the trade wind is in the vicinity of the tropics. Storms commencing in the torrid zone are carried in the direction of the upper currents of air. For instance, a storm started in the West Indies, by the heating of the air over one of its islands, thus causing an upward and circular movement of the air, usually sweeps to the west and north over Florida or the Gulf of Mexico, and then northeast over the United States. Similar causes acting upon the atmosphere of the sun would exhibit phenomena similar to those which we see. This explanation supposes the atmosphere of the sun to be warmer at the equator than at the poles; but as the sun does not, like the earth, receive its heat from any extraneous body, its difference of temperature must be sought for in the escape of its heat. It could attain this condition either by a more free radiation of heat at the poles than at the equator, or by its absorption as latent heat in the evaporation from large bodies of water in the polar regions. As the sun turns on its axis, its equatorial diameter must be greater than its polar, and the stratum of atmosphere above the luminous clouds must be thicker over the equatorial regions than over the poles. This must render the radiation less free at the equator than at the poles, and cause that part of the sun to be of a higher temperature. An excess of heat at the sun's equator, with its rotation on its axis, is sufficient to cause currents in its atmosphere similar to our trade winds and thus disturb its equatorial regions; and if the spots are caused by storms bursting open the luminous strata, their receding from the equator toward the poles is undoubtedly the effect of the same physical causes that give a similar motion to storms upon the earth."

In this manner we get a top view of the whirlwind which we could do in no other way. These two theories mutually strengthen each other. For those who have never examined diagrams of the sun's spots, as laid down by astronomers, and in this connection, the subject will be found worth considering.

(To be continued.)

Maple Sugar.

As the season for making this staple approaches we think that our country readers will find the subjoined article a valuable aid to their operations. The writer of it is a large sugar manufacturer in New Hampshire:—

The present high prices for cane sugars should stimulate the makers of maple sugar, the coming spring, to demand corresponding prices; to obtain which they must seek customers in season. When people once become familiar with the use of maple sugar for cooking and table use, for tea, coffee, &c., they prefer it to the best refined white cane sugars. There is a taste to nice maple sugar much more grateful than that of other sugars; and the neat housewife is not annoyed, when making a custard, by finding at the bottom of her bowl, sand, whiting, flies' wings, bugs and other insectivorous remains, peculiar to the warmer latitudes.

We have been in the practice of making annually, in our sugar establishment, from 2,500 to 3,500 pounds of maple sugar; and when we could obtain from two to four cents per pound more than the cost of the best loaf and granulated sugars, we have sometimes sold ourselves so short as to be obliged to buy for home use a barrel or two of the best granulated sugar. But excepting what was wanted for some kinds of preserves, which it was desired should be as colorless and transparent as possible, the female members of our two families have consented to the exchange with great reluctance.

But much depends upon the manner in which maple sugar is made. We have sold our sugar usually at the highest price—once as high as 15 cents per pound by the thousand pounds. We make our sugar in this way:—

Our buckets and holders are all thoroughly scalded and rinsed previous to setting. Our evaporating pans, of which we use eight, are scraped, washed and made perfectly clean before use. We then endeavor to gather and evaporate the sap, as speedily as possible after it has left the trees, to a consistency a little thinner than molasses.

It is then strained and set aside until we are ready to sugar it off. When we commence this process, to sirup enough to make 40 pounds of sugar we add one pint of milk and one or two eggs well beaten and mixed together. Place the sirup over the fire, and when the scum rises skim it off into a vessel for future use. After the skimming is through, remove the sirup from the fire and strain it through flannel, to remove all little curds, which if suffered to remain, would not only injure the quality, but by settling to the bottom would endanger burning. Now we wash our evaporating pan, return the sirup, and place it over a brisk fire, and evaporate as quickly as possible to the proper consistence. If it is to be caked, it must be harder than for tub sugar, or to stir off dry. Keep saleratus and all other drugs out of your sugar, if you desire a pure maple taste, and a wholesome article.

When the season is through, gather your utensils, and scald and scrub every one perfectly clean, if you wish to continue making good sugar in the future. In this order the evaporating pans are excepted, which should be put away in a dry place with the glazed coating on them, which is the best protection from rust.—*Journal of Agriculture.*

A NUMBER of large guns have lately been received at the Brooklyn navy-yard from the Fort Pitt Works, Pittsburgh, Pa.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Printing Floor-cloths.—In printing oil or floor-cloths it has hitherto been the practice to employ a separate block for each color, and those designs or patterns in which a large number of colors are employed involve a great deal of labor and time in the printing of them, as separate blocks are not only employed, but separate pads or cushions also for each color, in order that each block may be properly charged with the color designed for it. The printing, therefore, of elaborate designs by the old process is very slow and tedious, the proper registering of the blocks requires care and close attention, and the expeditious manipulation of them can only be acquired by time and practice. The cutting of the blocks is also an expensive feature, as each block is so cut as to form in relief the portions of the design which contains the color it is to print. This invention is designed to reduce the number of blocks to four for the printing of any design of any required number of colors, and to dispense entirely with the cutting of the blocks in relief to print the usual colors separately. It is the patent of John Marchbank, of Lansingburgh, N. Y.

Brick Press—This invention relates to an improvement in the manner of compressing or forcing the clay into the mold, whereby the clay will be forced into the angles of the mold, and the bricks or molded clay produced with sharp angles on the corners. The invention also relates to an improvement in the mold, whereby the same may be very readily adjusted in the press and discharged therefrom, and the mold allowed to be taken from the molded clay and left upon the pallet boards with the greatest facility. The invention further relates to an arrangement of rotating knives and scrapers employed for tempering the moistened clay when used in connection with a press-box and clod-crusher, so combined and arranged that the latter will, when the machine is in operation, always be supplied with a requisite quantity of clay for the molds. The inventor of this machine is J. A. Lafler, of Albion, N. Y.

Seeding Machine.—This invention relates to a device for varying the feed in cylinder drills and to a peculiar form of seed-delivering mechanism. The variation of the feed is effected by reversible duplex gear wheels which transmit motion from the axle to the cylinder shaft. By the use of four of the said gear wheels and an ingenious device for securing their stud shaft; seven changes are effected in the quantity of seed deposited upon a given area of ground. The delivery cylinders work in secondary hoppers constructed in such a manner as to prevent crushing or breaking the grain, insure a uniform flow of seed and expose the operation constantly to the view of the attendant. The machine embodies a number of other valuable improvements, making it altogether one of the most complete and efficient recently produced. It is the invention of Joseph Ingels, of Milton, Ind.

Operating and Sighting Guns.—By this improved mode of working guns the men and machinery employed to operate them are entirely protected from injury by an enemy's shot, the muzzles of the guns being pointed to suitable apertures in the deck of the vessel or in projections upon the deck, or in shot-proof casemates of any kind, through which apertures the guns are swabbed and loaded by steam power. For this purpose a combined swab and rammer is employed, attached to the piston of a steam engine, and provided with an automatic device for injecting water within the bore in the act of swabbing in order to cool or cleanse the gun. A scoop or ladle operated by steam is employed to elevate the charge to a suitable position to enter the muzzle. The gun is turned from below by means of a vertical pintle, preserved from the effect of the recoil by suitable springs. The improvements in sighting guns consist, first, in the use of telescopes of peculiar construction, by means of which distant objects can be viewed and the guns accurately sighted by a gunner situated below the deck upon which the guns are placed; and, secondly, in a device for concentrating the fire of two or more guns upon one point at any desired distance. The inventor is E. A. Stevens, of Hoboken, N. J.

Valve Gear of Steam Eagines.—This invention consists in a certain arrangement of valve connections whereby a single eccentric is rendered capable of operating the two induction and eduction valves of a double-engine with suitably arranged cylinders. It also consists in certain novel and simple means of shifting the eccentric for the purposes of varying the length of and reversing the movement of the valves, whereby a single eccentric is made to effect, in a better manner, all that is effected by two eccentrics and a link motion. W. R. Greenleaf, Silver Creek, N. Y., is the inventor of this device.

Revolving Fire-arm.—This invention consists in securing the cylinder axis pin in place by means of a bar or rib attached to the under side of the barrel by a screw or other pivot, upon which it is capable of turning transversely to the barrel for the purpose of releasing the pin when it is desired to remove the cylinder, such rib or bar holding the pin at a point forward of the connection of the lever of the rammer when such lever is attached to the pin, and so preventing the pin from being strained by the act of ramming home the charges. It also consists in making the lower surface of the said bar or rib in such form that it shall serve as a bed or resting place for the lever of the rammer when the said bar or rib is brought parallel with the barrel and the loading lever is brought into the position it is desired to occupy when not in use, whereby the lever, when locked, is made to secure the rib or bar against displacement and injury by an accidental blow or pressure. Fordyce Beals, of New Haven, Conn., is the inventor of this improvement.

Air Engine.—This invention consists in the attachment of the pump cylinder of an air engine to the working piston and the employment of a stationary compressing piston, the object being to employ the weight of the said cylinder to aid the working piston in its downward or return stroke, the engine being single-acting and the air only operating to produce the upward stroke. It also consists in a certain arrangement of the induction and eduction valves and valve chest of the working cylinder of the engine, whereby great facility is afforded for getting at the valves whenever necessary. Henry Messer, of Roxbury, Mass., is the inventor of this device.

Steam Engine.—This invention relates to that class of steam engines known as trunk engines, and it consists in a construction and mode of applying and operating the induction and eduction valves of such an engine, to cause the admission of steam from the boiler to the cylinder on that side of the piston on which the trunk is situated and which presents but a comparatively small area in annular form, and to cause the steam, after it has produced a stroke of the piston by its action on that side, to pass to the opposite side and produce the return stroke by the action of its expansive force on the larger area of the latter side, by which means, the area of the two sides of the piston being properly proportioned, a nearly uniform development of power is obtained during both strokes or during the complete revolution of the shaft. Thomas Northey, of Saint Mayben Parish, England, is the inventor of this device. His present address is Hamilton, C. W.

The Way they make Hot-beds in Germany.

Take white cotton cloth of a close texture, stretch and nail it on frames of any size you wish; take 2 ounces of lime-water, 4 ounces of linseed oil, 1 ounce of white of eggs, 2 ounces of yelk of eggs, mix the lime and oil with very gentle heat, beat the eggs well separately, mix them with the former; spread the mixture with a paint-brush over the surface of the cotton, allowing each coat to dry before another is put on, until they become water-proof. The following are the advantages this shade possesses over a glass one:—First, the cost is hardly one-fourth. Second, repairs are easily made. Third, they are light; they do not require watering no matter how intense the heat of the sun; the plants are not struck down or burnt, faded or checked in growth; neither do they grow up so long, sickly and weakly as they do under glass, and yet there is abundance of light. Fourth, The heat arising entirely from below is more equable and temperate, which is a great object. The vapor arising from manure and earth is condensed by the cool air passing over the shade and stands in drops on the inside, and therefore the plants do not require as frequent watering. If the frames are large they should be intersected by cross-bars about a foot square to support the cloth. These articles are just the thing for bringing forward seeds in season for transplanting.

VALUABLE RECEIPTS.

SOLDERS.—In addition to the receipt given in our last for solders, the following is a useful table of solders with their fusing points:—

No.	Parts of Tin.	Lead.	Melting Degrees, Fah.
1	1	25	558
2	1	10	541
3	1	5	511
4	1	3	482
5	1	2	441
6	1	1	370
7	1½	1	334
8	2	1	340
9	3	1	356
10	4	1	365
11	5	1	378
12	6	1	381
13	4	4	1 Bismuth 320
14	3	3	1 " 310
15	2	2	1 " 292
16	1	1	1 " 254
17	1	2	2 " 236
18	5	3	3 " 202

The alloy No. 8 is used sometimes for soldering cast-iron and steel; the flux used for this purpose is sal-ammoniac, but common resin may be employed. Gold and silver are sometimes soldered with pure tin and a flux of resin. Copper, brass and gun metal are soldered with No. 8 and a flux of resin or sal-ammoniac. The chloride of zinc is used for soldering sheet and plate iron as a flux with the same solder. Lead and tin pipes are soldered by plumbers with No. 6, 7 and 8 and a flux of resin and sweet oil. In soldering with soft brass the ends of the article to be soldered are secured together by a wire and granulated solder and powdered borax are mixed in a cup with a small quantity of water and spread along the joint with a spoon. The article is then placed in a clear fire and the solder melts at a bright red heat, when the article is then removed from the fire. In soldering small articles with the blow-pipe they are supported on a piece of charcoal or what is better pumice-stone, and the flame is ejected upon the solder. In soldering lead pipes, the parts to which the solder is not to be attached are usually covered with a mixture of lamp-black and size. In soldering any articles care must be exercised to have the edges of the plates or articles perfectly clean or the solder will not adhere. A flux is employed for the purpose of preventing oxidation. Resin and sal-ammoniac powdered and mixed together make a good flux for copper and sheet iron soldering. In other cases a strong solution of sal-ammoniac is used to moisten the edges of the joint, then the resin is sprinkled upon it and the solder applied. The chloride of zinc is made by dissolving pieces of zinc in muriatic acid. It is well adapted for soldering zinc plates and pipes, and is applied with a brush to moisten the edge of the article to be soldered. The solder is then applied in the usual way with a tool. Zinc is a very difficult metal to solder because it is so easily coated with oxide, and it also volatilizes with heat.

ARTIFICIAL CORAL FOR GROTTOES AND OTHER ORNAMENTATIONS.—To 2 drachms of vermilion add 1 ounce of resin and melt them together. Have ready the branches or twigs peeled and dried and paint them over with this mixture while hot. The twigs being covered, hold them over a gentle fire, turning them round till they are perfectly covered and smooth. White coral may also be made with white lead and resin. When irregular branches are required, the sprays of an old black-thorn are best adapted for the purpose, and for regular branches the younger shoots of the elm are most suitable. Cinders, stones or any other materials may be dipped in the mixture and made to assume the appearance of coral.

ZINC WASH FOR ROOMS.—Mix oxide of zinc with common size and apply it with a brush, like lime whitewash, to the ceiling of a room. After this apply a wash, in the same manner, of the chloride of zinc, which will combine with the oxide and form a smooth cement with a shining surface.

A NEWSPAPER was started not long ago, the first number of which contained a letter from a correspondent signed "A Constant Reader."

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Correspondence

Petroleum.

MESSRS. EDITORS :—It is gratifying to observe how fast our people are becoming acquainted with the properties of crude and refined petroleum or rock oil. An article that promises to benefit such vast interests to mankind, and to the American people in particular, deserves all the elucidation that can be given it. I have read with great pleasure many articles on the subject, but sometimes I have been pained at the ignorance displayed by those who have attempted to enlighten the public.

It was stated before the Committee of the Common Council of Brooklyn, after the great fire which destroyed the petroleum yard of Messrs. Schieffelin Brothers & Co., last summer, that the cause of the fire was as follows :—"The day being hot, a large quantity of the subtle gas was generated in the hold of the lighter, and when the hatches were removed this gas came in contact with the oxygen of the atmosphere and exploded, causing the death of two persons and the loss of a vast amount of property." It was also stated that there were two gases generated—a light gas and a heavy gas ; and afterwards that the gas generated from this oil or petroleum was always lighter than the atmosphere. In nearly all cases, writers who have attempted to elucidate this subject, have spoken of the gas or gases generated by the distillation or evaporation of petroleum. Now, a *gas* is a permanently elastic aeriform fluid, in many instances incondensible by any means we possess ; but a *vapor* is an elastic fluid easily condensed by cold. We do not say when we distill water, that we convert it into gas and then condense it ; we say that we convert it into steam, or vapor, in which form it is easily condensed by cold. If we converted the water into the two gases of which it is composed—hydrogen and oxygen—we could never condense them by any cold or pressure which we possess. In distilling petroleum, or when it evaporates in the open air, only the *vapor* of petroleum is produced. This vapor is easily condensed by cold, and even when generated from the lightest part of petroleum, or naphtha, it is always heavier than atmospheric air. I have often seen it flow over the sides of a tank like water, when I have had occasion to elevate the temperature of naphtha by steam up to 150° or 180° Farenheit. Mr. Lockwood, the superintendent of Messrs. Schieffelin Brothers' petroleum yard, once said to me :—"Can you inform me why it is that a fog sometimes hangs around the barrels in our petroleum sheds, when we open the doors in the morning?" I said :—"Yes ; your barrels leak ; the air around them is saturated with the vapor of petroleum ; and when you open your doors, the cold air rushes in and condenses the vapor so fast that it is visible like a fog." The writer has said to parties who were constructing sheds for petroleum, that they ought to be made with open-work on the sides, so as to allow the air to sweep through them, and remove these vapors as fast as they are formed. When ships are loaded with petroleum, it should be arranged, if possible, to remove this vapor from the hold by ventilation, as fast as it accumulates. It will be remembered that the vapor of petroleum, or naphtha, when mixed with atmospheric air, in the proportions of from six to twelve parts of air to one part of vapor, forms a very dangerous and explosive mixture when brought in contact with flame. The best plan for exporting crude or refined petroleum would be to construct vessels of iron, with partitions or bulk-heads, so as to make permanent tanks into which the oil could be poured, and the man-hole plates screwed and packed so securely that a fire might be built over them without danger ; and as the oil is lighter than water, the ship might be so constructed that she could not sink or founder at sea. On the arrival of the ship at her port of destination the oil could be removed into barrels or tanks, by pumps, in less time than is required to discharge a cargo now. Insurance on such a vessel could be effected at a very low rate. I think vessels of this description will eventually be loaded from oil-ducts, reaching perhaps as far as to the oil wells in Pennsylvania, if the vast storehouses of these oils do not soon become exhausted, and we see no reason why they should, when we consider the vast extent of our coal-fields, and the fact that in some parts of the world there are flowing wells which are known to have been yielding their products for more than two thousand years.

I will now say a few words in regard to the formation of coal, from which comes the petroleum or rock oil. Coal is the product of a former vegetable world. By analysis, we can determine the manner in which the vegetables were transformed into coal. Oak wood, for instance, is found to consist of carbon, 36 parts ; hydrogen, 22 parts ; and oxygen, 22 parts. Now, if we take the sawdust of oak wood, moisten it and place it in a closed vessel, carbonic acid gas is produced ; the wood assumes a white color, and corresponds, if it is analyzed, to the white decayed wood found in the trunks of old trees. An analysis of this white decayed wood gives carbon, 33 parts ; hydrogen, 27 parts ; and oxygen, 24 parts. The elements of the water have united with the wood and carbonic acid gas has been evolved.

	C.	H.	O.
Thus, take wood	36	22	22
To this add five atoms of water		5	5
And three atoms of oxygen			3
	36	27	30
Then take from this three atoms of carbonic acid gas	3		6
	33	27	24

We then have the formula for decayed wood.

The analysis of brown or wood coal (extensive beds of which are found where the woody fiber is so pefect that the annual rings can be counted) gives carbon, 33 parts ; hydrogen, 21 parts ; and oxygen, 16 parts.

	C.	H.	O.
Now if we take wood	36	22	22
And deduct one atom of hydrogen and three atoms of car. acid gas	3	1	6
	33	21	16

We then have the formula for brown coal.

The analysis of brown coal where the traces of woody fiber have nearly disappeared, such as is taken from great depths and is covered by thick layers of basalt, has been found upon analysis to consist of carbon, 32 parts ; hydrogen, 15 ; and oxygen, 9 ; showing a further separation of the elements of carbonic acid gas and water. This process of the separation of the elements of carbonic acid gas and the elements of water is still going on ; for in districts where large layers of brown coal exist, springs impregnated with carbonic acid gas abound.

The composition of cannel and similar coal is found by analysis to be carbon 24 parts ; hydrogen, 13 parts ; and oxygen, 1 part. Taking wood (C. 36, H. 22, O. 22), and deducting therefrom three atoms of carbureted hydrogen (C. 3, H. 6), three atoms of water (H. 3, O. 3), and nine atoms of carbonic acid gas (C. 9, O. 18), we have (C. 24, H. 13, O. 1) which is the formula for cannel coal.

Now it is known that carbureted hydrogen is being generated wherever mineral coal exists in large beds in the earth, as well as carbonic acid and olefiant gas ; for from the fissures in the coal strata and rocks of the coal formation, these gases are being constantly generated, producing fire-damps in mines and filling caves and fissures in the earth's strata, when condensed, with the petroleum or rock oil. It has been ascertained that these deposits of rock oil or petroleum are found generally in districts where the strata have been thrown up, causing caves and fissures, which are filled with the condensed vapors under pressure that are being constantly generated from the coal-beds. Where the strata are sand-stone, the oil will be absorbed and we shall have a bituminous sand-stone ; where they are argillaceous, we shall have bituminous shales, boghead coal, &c. ; where the petroleum is hardened by heat, we shall have the asphaltum, Albert coal, &c.

When we consider the vast extent of our coal-fields (nearly 100,000 square miles having already been surveyed), and that the process of condensing and hardening the softer coals is still going forward in the earth till they may, in the course of long ages, approximate the hard anthracite, we shall not incline to believe the supply of petroleum will soon be exhausted. From some study of the geology of the State of New York, I have been led to the conclusion that petroleum will be found in this State. It would hardly warrant individual enterprise to embark in the examinations and expenditures necessary to establish the fact. I think the State should make an appropriation, and appoint a scientific board or corps to make the examination.

I have been induced to make the foregoing remarks in regard to the formation of coal and petroleum partly from some recent statements that have been made, that "petroleum was formed long before the coal, and is the result of the decomposition, under pressure, of an infinite number of oil-yielding animals, which swarmed in the seas of the Devonian period, long anterior to the coal."

The injurious or beneficial effect of petroleum on the health of those engaged in refining and working in the oil, is a subject of great and increasing interest, since there are at this time from 30,000 to 50,000 persons engaged in the business, which is yet in its infancy ; and this fact leads me to make a few observations on the subject, having had the superintendence of a coal-oil refinery for a long time. I have men who sleep and live in the factory and are in the vapors of the oil nearly all of the time, and they enjoy remarkable good health ; indeed, some have become more fleshy and robust since they commenced to work on the oil. I think it safe to say that the refiners of petroleum oil are as healthy a set of men as can be found in any other business. Persons with weak lungs, or of asthmatic tendency, find great relief on inhaling the vapor of petroleum or an atmosphere impregnated with it. For some chronic diseases its external application has been found very beneficial. The writer has given his attention to its curative properties in several directions, and hopes before long to be able to give some information that will be beneficial.

E. G. KELLEY,
Analytical and Consulting Chemist.
New York, Jan. 15, 1863.

Ivory.

The immense demand for elephants' teeth has of late years increased its supply from all parts of Africa. At the end of the last century the annual average importation into England was only 192,600 pounds ; in 1827 it reached 364,784 pounds or 6,080 tusks, which would require the death of at least 3,930 male elephants. It is probable that the slaughter is much greater, for the teeth of the female elephant are very small, and Burchell tells us, in his African travels, that he met with some elephant hunters who had shot twelve huge fellows, which, however, altogether produced no more than two hundred pounds of ivory. To produce 1,000,000 pounds of ivory, the present annual English import, we should require (estimating each tusk at 60 pounds) the life of 8,333 male elephants. It is said that 4,000 tuskers suffer death every year to supply this country with combs, knife-handles, billiard balls, &c.

A tusk weighing 70 pounds and upward is considered by dealers as first-class. Cuvier formed a table of the most remarkable tusks of which any account has been given. The largest on record was one which was sold at Amsterdam, which weighed 350 pounds ; in the late sales in London the largest of the Bombay and Zanzibar was 122 pounds ; of Angola and Lisbon 69 pounds ; of Cape of Good Hope and Natal 106 pounds ; of Cape Coast Castle, Lagos, &c., 114 pounds ; of Gaboon 91 pounds ; of Egyptian 114. But it must not be inferred from this that large tusks are now rare. On the contrary, it is probable that more long and heavy teeth are now brought to market than in any previous century. A short time ago Julius Pratt & Co., cut up at their establishment at Meriden, Conn., a tusk that was nine and a half feet long, eight inches in diameter, and which weighed nearly eight hundred pounds. The same firm in 1851 sent to the World's Fair, London, the widest, finest and largest piece of ivory ever sawed out. By wonderful machinery, invented in their own factory, they sawed out (and the process of sawing did the work of polishing at the same time) a strip of ivory 41 feet long and 12 inches wide. It took the precedence of all the specimens sent in by England, France or Germany, and received rewarding attention from the Commission.

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It may be asked what can be done with such an immense piece of ivory? We reply that the time has come when this beautiful material can be used for purposes of veneering, and we shall soon doubtless see tables, bureaus, writing-desks and other members of the furniture family rendered as resplendent as the throne of Solomon. We believe that it is now contemplated by Steinway & Sons to build a piano whose keys shall not be the only portion from the teeth of the African elephant, but an instrument whose whole surface shall be veneered with burnished virgin ivory. One thing is certain, that any pianoforte manufacturer who should first attempt this will make a sensation by the novelty of the affair, and will doubtless be well rewarded for his labor.

The most costly tusks, or portions of tusks, are those which are used for billiard-balls. What are termed "cut points" of just the right size for billiard-balls, from 2⅞ to 3⅝ in diameter, brought the highest price (£53) per cut of any ivory offered in the London market at the late sales. Billiard-ball making has of late become a very important item of manufacture in this country.

The teeth from the West coast, with the exception of Gaboon, are less elastic, and less capable of bleaching, than those that come from other portions of Africa. The West coast tusks are much used for knife handles. Since the French have possessed Algeria, France receives a considerable portion of ivory from Central Africa by the large caravans that travel from Timbuctoo northward.

Ivory is also furnished by the walrus or sea-horse, and commands a price equal to the best qualities of elephant ivory. It is, however, too hard and non-elastic for many purposes, and has the disadvantage of being too small to cut up profitably.—*Exchange.*

Phosphorescence.

A peculiar emission of light, called "phosphorescence," manifests itself under certain circumstances in minerals, vegetables and animals. In some places, and under certain conditions, the sea becomes phosphorescent. In the wake of a ship and in the dip of a paddle the water flashes like scales of silver, and the sight becomes fascinating. The phenomenon is common in the warmer seas. Ehrenberg, the naturalist, explains the cause and states that "the earth-worm, *lumbricus*, is luminous in October during its period of coupling; and the *egrosoma atlantica* and *salpoe* among the *tunicata* illuminate the warmer seas for miles and miles with a pale phoshoric light." Fish of the scaly order, like the mackerel, when decaying, emit a brilliant phosphorescence; and many insects—especially the common fire-fly—display a beautiful light.

Perhaps the most remarkable exhibition of phosphorescence is that which Dr. Phipson has noticed in *man* himself. He asserts that when the optic nerve is cut or injured, no pain is then felt, but flashes of light are perceived. The light, like that of the glow-worm and other phosphorescent animals, is of a greenish yellow tint. It occurs, likewise, when an electric current is passed along the optic nerve, and in febrile diseases, and by the use of narcotic medicines. "A production of light in the above circumstances," says Dr. Phipson, "is exceedingly interesting, and tends perhaps, more than we are aware, to establish the fact that the phenomena of light are owing to a *vibratory* movement of matter."

In the mineral world phosphoresence is induced in many cases by insulation, exposure to the light of the sun, by friction, electricity and chemical changes. There have been recorded cases of luminous rains, snows, hail and especially dry fogs. Some of these, in South America, have emitted so much phosphorescence that travelers have been able to see by them during night in dangerous mountain roads.

Among vegetables phosphoric properties are developed to a high degree in certain fungi, which are phosphorescent whilst living; for instance, the famous *agaricus olearius*, which grows at the foot of the olive trees in Italy.

THE island of Fayal in the Atlantic has been almost desolated recently by a succession of earthquakes. Many of the inhabitants have left it and gone to other islands of the Azorian group.

CONDITION OF THE STATE OF NEW YORK.

WEALTH AND TAXATION.—The aggregate valuation of real and personal property in the State, for 1862, was $1,449,303,948. This exceeds the previous years' estimate by $7,536,515, although the valuations of the cities of New York and Brooklyn were reduced $50,000,000. The State tax of last year was at the rate of four mills and three-fourths per dollar on taxable property. According to the estimates of the Comptroller, less than one half of that rate will be sufficient for the present year, unless some extraordinary appropriations shall be made by the Legislature.

CANALS AND RAILROADS.—The canals of New York are the property of the State. The gross receipts for tolls on them, last year, up to the 30th of September, was $5,180,000. The estimated tunnage on the canals was 4,900,000 tuns; on railroads 6,600,000 tuns; and the estimated value of property carried on canals and railroads was $300,000,000. The canal debt is $23,981,610. The total debt of the State is $30,487,264. The canal debt was reduced $2,100,000 during the year, thus showing the prosperous condition of State affairs. By abstaining from borrowing and depositing the usual contributions to the Sinking Funds, the entire State debt will be canceled in twelve years. The receipts from all sources during the fiscal year, up to Sept. 30th, amounted to $20,840,913; the payments in the same period were $18,165,233, leaving a yearly balance of $2,675,680.

POPULATION.—In 1860, the population of New York was 3,880,728. The number of persons enrolled as liable to military duty was 764,603. Since the beginning of the present war the State has sent 222,836 men to the war, and the number now in the army is 125,000. No less than 97,836 have lost their lives or have been rendered unfit for further service, which is an annual waste of life equal to 33 per cent. of the whole number of the people.

EMIGRATION.—The Commissioners of Emigration report that, during 1862, the number of emigrants that arrived at New York was 75,982, which was an increase of 10,453 over the previous year.

BANKING CAPITAL OF NEW YORK.—The annual report of the Superintendent of the Banking Department shows that the total amount of outstanding circulation issued by that officer, up to the 30th of September, to banks, banking associations, and individuals is $42,239,836. This circulation is secured as follows:—

By Bonds and Mortgages	$4,912,494
New York State Stock	19,022,890
Stock of other States	438,466
United States Stock	11,899,450
Held for Incorporated Banks	65,289
Cash on Deposit	103,720
Total	$36,442,309

There are 305 banks doing business.

MISCELLANEOUS.—The sum of $3,500,000 was paid for bounties to soldiers. This large amount was advanced by the Commercial Bank of Albany. In 1861, 10,000 Enfield rifles were purchased by the State, at a cost of $191,288. These have been transferred to the United States. The enlargement of the New York Canals was commenced in 1835, and the cost was then estimated to be $12,000,000 with twelve years of labor. It has cost $40,000,000, and is now completed at the end of 27 years. The income of the State from the Salina Salt Springs was $81,189; expenditures $40,278, leaving a balance of $40,911. The number of bushels of salt was $10,000,000.

RECEIPTS OF DOMESTIC PRODUCE.—The *New York Shipping List and Prices Current* states that the receipts of domestic produce at New York during 1862 were as follows:—Flour, 5,757,608 barrels; corn meal, 139,330 barrels, also 231,916 bags; wheat, 27,079,259 bushels; rye, 932,084 bushels; corn, 17,290,234 bushels; barley, 1,151,818 bushels; oats, 5,051,874 bushels; malt, 613,250 bushels; seed, 193,551 bushels; whisky, 353,425 barrels; ashes, 16,995 packages; dressed hogs, 147,843 carcasses; oil cake, 79,336 packages; pork, 369,200 barrels; beef, 235,276 packages; cut meats, 317,784 packages; lard, 372,221 packages also 88,621 kegs.

A LETTER from an officer on board the United States steamer *Bibb*, off Charleston, says Fort Sumter has been plated with railroad iron.

The Vegetable and Animal Products of Ohio.

As it respects agriculture, the State of Ohio has exhibited much intelligent enterpris in collecting statistics and disseminating useful information. At the head of its Agricultural Department is Mr. John H. Klippart, a gentleman eminently qualified for this important position. He has recently furnished the *Ohio Farmer* with statistics of the agricultural (vegetable and animal) products of Ohio, from which we condense some very interesting information.

The area of Ohio is estimated at 42,500 square miles, but the land surface only equals 39,964 miles, or 25,576,960 acres, of which 12,210,154 acres are woodland, 3,754,024 pasture land, and 9,351,921 plain land. There are 277,000 land owners in Ohio. From 1850 to 1861, the aggregate production of cereals was as follows:—

	Acres.	Bushels.
Wheat	1,650,944	20,080,774
Corn	2,010,521	68,045,179
Rye	88,100	823,489
Barley	90,143	1,636,562
Buckwheat	84,925	1,119,899
Oats	718,269	16,510,470
Total	4,642,902	108,216,373

The population of Ohio is estimated at 2,000,000.

The amount and value of the actual agricultural products of the State, exclusive of any animal products, may be summed up as follows:—

Wheat	20,080,774 bush.	@1,00	$20,080,774
Corn	68,035,179 "	@0,25c.	17,011,295
Rye	823,489 "	@0,50c.	411,744
Barley	1,636,562 "	@0,65c.	1,063,765
Buckwheat	1,119,899 "	@0,40c.	447,959
Oats	16,510,470 "	@0,22c.	3,632,203
Potatoes	8,237,727 "	@0,35c.	2,883,204
Tobacco	25,000,000 lbs.	@0,06c.	1,500,000
Hay	1,727,617 tuns	@6.00	10,365,702
Clover Seed	216,545 bush.	@4,00	866,180
Grass Seed	54,475 "	@1 50	80,212
Peas and Beans	105,219 "	@1,00	105,219
Sweet Potatoes	297,908 "	@1,00	297,908
Flax	446,932 lbs.	@0,05c.	22,346
Flax Seed	250,768 bush.	@1,00	250,768
Hops	22,344 lbs.	@0,20c.	446,880
Orchard Products	———	———	1,858,073
Market Gardens	———	———	860,313
Wine	562,640 galls.	@1,00	562,640
Maple Sugar	3,323,942 lbs.	@0,07c.	232,675
Maple Sirup	392,932 galls.	@0 50c.	196,466
Sorgho Sirup	2,500,000 "	@0,40c.	1,000,000
Total Vegetable Products			$64,176,926

In Ohio there are 612,333 horses; 1,837,938 cattle; 3,725,015 sheep, and 2,123,830 swine.

The following are the annual animal products:—

	Pounds.
Butter for 1859-61	41,486,475
Cheese " "	23,083,924
Wool " "	10,648,161
Honey " "	1,389,292
Beeswax " "	52,415

The actual value of animals and the annual value of vegetable and animal products amount to the sum of $185,000,000, which is at the rate of $92 50 to each person in the population—old and young.

Arsenical Ornaments.

A few days ago a little girl had a bunch of artificial grapes given to her. After amusing herself with the toy she gave it to a playmate of her own age, who presently picked a grape off the bunch and sucked it. The next day she was a corpse. An eminent physician, who analysed the fatal plaything, deposed that ten of the grapes yielded three grains of arsenite of cooper—a deadly poison—and that each vine-leaf on the bunch contained enough to kill a child. Another child's cupboard, in which its toys were kept, was lined with green paper. The poor little thing sickened and died, obviously from the effects of poison mysteriously imbibed. Dr. Letheby analyzed the paper-hanging of the cupboard, and found that a piece of it only six inches square contained nearly thirteen grains of the deadly compound—enough to kill two grown-up persons!—*London Inquirer.*

The "Cimerone."

The side-wheel, double-bowed steamer *Cimerone*, which arrived here on Monday, from Port Royal, will go out of commission in a few days. On account of her unseaworthiness, it is hardly probable that she will again be used for active service. She was built on nearly the same plan as the *Tacony*, now being constructed at our navy yard.—*Phil. Inquirer.*

[The *Cimerone* is one of the new gunboats; this vessel has only made one voyage and now she is useless. Who is responsible for this?—EDS.

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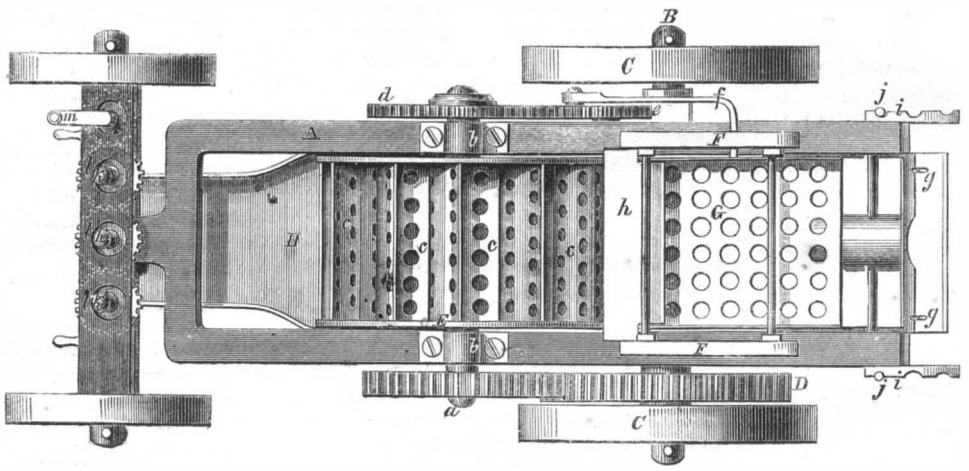
Improved Potato-digger.

Herewith we illustrate another one of those agricultural machin s which our inventors are continually producing or the benefit of the farmers. Potato-digging by hand is not the most agreeable business in the world, especially in bad weather, and it also takes a great amount of labor and time. This machine consists of the wrought-iron frame, A, supporte y the axle, B, provided with traction wheels, C. Th is axle is further provided with the gear wheel, D, w ich works in another attached to the shaft, *a*, running in the bearings, *b*, on the iron frame, A. Upon this shaft the cylinder, E, is secured and furnished with the perforated curved buckets, *c*. The opposite end of the shaft, *a*, is provided with the gear, *d*, which drives the small pinion, *e*. There is in this latter pinion a small crank pin which is connected to the offset-connecting rod, *f*. This connecting rod is attached to the trestle frame, F, belonging to the perforated hopper, G. The bottoms of this hopper are pivoted and furnished with handles so that they can be tilted to allow the contents to be discharged into baskets or sacks hanging on the hooks, *g*. There is also a chute board, *h*, which conducts the potatoes over into the vibrating hopper. The notched segment bars, *i i*, are attached to the side of the frame for the purpose of holding the handles, *j*, that operate the hopper bottoms, in position; the latter cannot be shown in our engraving. The forward part of the machine has a shovel, H, supported upon a cross-bar, pendent from the frame (also invisible), and connected at its other end by the screw bolts, *k*, working through the axle to the threaded gears, *l l l*. By means of the handle, *m*, the hight of the shovel and, consequently, the depth to which it digs, can be accurately adjusted. The operation of this machine is very simple; when the team, by which the machine is drawn, advances, the shovel enters the ground and takes up the potatoes and dirt with them. They work up to the revolving cylinder, which takes them in and carries them with it to the chute board, *h*. They are then discharged into the hopper, G, which is made to vibrate by the connecting rod, *f*; this sifting motion detaches the loose dirt and cleans the vegetables. The chute also prevents the potatoes from falling between the buckets and the hopper. From this last receptacle they are discharged into sacks. This seems to be a very simple and efficient machine in its construction and operation, and one that we think might be profitably employed in numberless instances.

The patent for this invention was granted December 9, 1862, through the Scientific American Patent Agency to Mr. Thomas Lane, of Gold Hill, Nevada Territory. Further information may be had by addressing the inventor, in care of Howland & Co., Miner's Foundry, San Francisco, Cal.

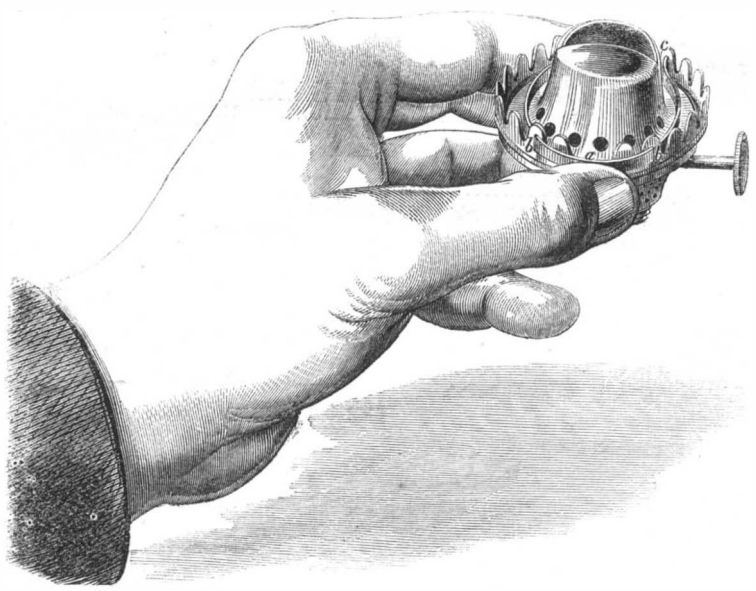


LANE'S PATENT POTATO-DIGGER.

Improved Patent Chimney-fastener.

The accompanying engraving illustrates a mode of securing the chimneys of kerosene and other lamps. It is a very simple plan, and prevents effectually any detachment of the glass by accident. The spring, *a*, passes through the outer edge of the ornamental cap at *b*, and spanning the cone enters the cap again at *c* and is there secured. When not compressed by the thumb and finger it remains in the position shown in the engraving. When pressure is applied to the bow of the spring it expands closely against the sides of the cap and allows the chimney to be placed upon its seat, the fingers are then removed and the spring collapses over the flange upon the chimney bottom and retains it firmly in its place. This exceedingly neat device must, we think, become highly popular on account of its freedom from complication and its efficiency for the purpose designed.

A patent for this attachment has been obtained through the Scientific American Patent Agency, and the claim will be found in this week's list. Any further information can be had by addressing the inventor, H. H. Swift, Hart's Village, N. Y.



SWIFT'S PATENT CHIMNEY-FASTENER.

Experiments with Hydro-motors.

We find a paragraph going the rounds of the press concerning a pseudo-novel method of propelling boats by the impact of a current of water, under a high velocity projected from the sides of the vessel, either below the bottom of the same or near the surface of the river. An account of this experiment is translated into a French journal as having been lately tried with grand results in Holland. This is one of the oldest methods proposed for moving vessels, and has been tried time and again without any beneficial results to speak of, certainly not as regards speed or economy. The power expended by the steam engine in drawing the water and forcing the same through narrow passages is not utilized, exerting a much less force upon the vessel than it would if employed upon either screw or paddle. The current of water projected from the pipe does not part with its velocity but it penetrates in bulk the sea about it. In other words it slips, and the boat moves at a very slow rate, considering the power expended. This experiment has been lately tried in this city with one of Cary's rotary pumps driven at great speed, but it was soon abandoned. The experimenter was scarcely able to stem the tide in the East River with a boat of about two or three tuns burthen.

DANDRUFF is a vegetable formation in the human system.

A STEAM BOILER EXPLOSION TRIAL.

An important steam boiler explosion case is now on trial at Bridgeport, Conn., before Judge McCurdy, and is attracting considerable attention. The facts involved in the case may be briefly summed up as follows:—Wheeler Beers, a plumber and gas-fitter, doing business in Bridgeport, engaged the Woodruff & Beach Machine Company, doing business in Hartford, Conn., to furnish him with a boiler suitable to drive the machinery of his establishment. Not long after the boiler was set and put in operation the cast-iron head blew off, which not only nearly destroyed the workshop of Mr. Beers, but also caused some damage to an adjoining building by the falling of the walls. The plaintiff alleges that the iron used in the boiler head was of an inferior quality, and that this was the cause of the accident. The defendants deny the allegation, and contend that the boiler was made of the very best quality of iron, and was not inferior to hundreds of others which they have made for many years past and which have stood the severest tests. Upon a former trial, we understand, the jury awarded Mr. Beers $2,500 damages; but the defendants were not satisfied with the verdict and applied for and obtained an order for an new trial, which is now progressing. In order to fully establish the merits of the case, it was thought necessary to enter pretty freely into the theory of steam boiler explosions and other questions connected with the manufacture and management of steam boilers. A number of scientific experts have been examined, among whom we noticed Alexander L. Holly, Henry B. Renwick and Charles W. Copeland, of this city. The case is conducted for the plaintiff by E. W. Stoughton, Esq., and for the defendant by E. N. Dickerson, Esq., both well-known patent lawyers of this city. The jury appears to be composed of a very intelligent set of men; but we have no doubt its members are astonished, as well as be-fogged, at the profound displays which the learned gentlemen are making of their science. We imagine that the case will turn simply upon the question as to whether the iron was of a good or bad quality.

The above case is a somewhat novel one, and, as the issue will interest many of our readers, we shall refer to it again.

THE YIELD OF GRAIN IN ENGLAND.—The London *Mark Lane Express* gives a table comprising the average yield per acre, of wheat, barley, oats, beans, and peas, for thirty-eight counties in England, prepared from returns received from correspondents of that paper. The average for the cereal grains mentioned is as follows:—Wheat, 29 bushels; barley, 37¾ bushels; oats, 46½ bushels. The lowest average of wheat in any county returned is 22¼ bushels per acre, in Devonshire, and the highest 34½ bushels, in Lancashire. The lowest average of barley is 29 bushels per acre, in Shropshire, and the highest 44 bushels, in Northampton. The lowest average of oats is 34¾ bushels, in Westmoreland, and the highest 59½, in Cambridgeshire. The beans mentioned are a kind not much cultivated in this country; the average yield is 32½ bushels per acre; the average yield of peas is 30 bushels per acre.

THERE are no less than eighty-five languages spoken in New York city by natives of as many different nations.

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NEW YORK, SATURDAY, JANUARY 24, 1863.

THE BLAST FOR IRON FURNACES.

In the manufacture of iron, a blast of air is forced into the furnace by machinery to support combustion. The object of this is to intensify the heat, without which the iron in the ore could not be melted and separated from the impurities in the ore. Success and economy in iron-smelting are due mostly to the management of the blast, and yet this subject has not in common practice received that general and minute attention which it should command. It has been calculated that, with the air of a blast heated to 300° Fah., about eight tuns of air are forced into the furnace in making one tun of iron. In a furnace, therefore, which produces 20 tuns of pig iron per day, no less than 160 tuns of air must be pumped into it. The amount of power required to work a furnace is therefore very great, and especially so when the atmosphere is moist, because in such a case a considerable quantity of water in vapor is forced into the fire, and its capacity for heat is so much greater than that of dry air, that an extra amount of fuel is wasted thereby. In clear cool weather, when the air is free from moisture, a furnace works better and with more economy than when the atmosphere is charged with vapor. If iron-smelters therefore could employ some cheap chemical substance, through which the air could be passed, to absorb its moisture before entering the heater of the furnace, a great saving of fuel would be effected and a more intense heat maintained.

It is still asserted by many persons, that superior iron is produced with the cold blast directed into the furnace, instead of the more general mode of heating the blast first. The hot blast, however, increases the yield of iron. In a furnace using the cold blast, and another the hot blast, both being of equal capacity and smelting the same ore, the latter will yield one-third more tuns of iron in the same space of time. It has been asserted that there is no other advantage derived from the hot blast; that it requires as much fuel and as much flux to the ore, as in using the cold blast. This, however, is a moot point, as many iron-makers contend, that the hot blast saves both fuel and flux, as well as time in making iron. Perhaps the saving of fuel is more important than any other item connected with smelting iron; it is more important at least than is most generally conjectured, to the obtaining of a superior quality of iron. Thus, for example, sulphur is most injurious in its influence upon iron, and the coal, especially that of our Alleghany coal fields, contains a considerable quantity of it. It is therefore self evident that if iron ore could be smelted with one-half the quantity of fuel to the tun, it would be exposed to but one-half the quantity of sulphur, and a superior product would be obtained. Every attention should then be devoted to the saving of fuel in smelting iron, not only as a question of direct economy, but of collateral economy also in making a superior quality of iron, which will bring a higher price. If the hot blast economizes fuel, it should also produce a superior iron, with proper care. It is generally believed that this would be the result, but it is contended that more slag is retained in hot than cold blast iron. Here is another point for the consideration of iron manufacturers, and it invites efforts for improvement.

In the Clyde Iron-works, Scotland, where the hot blast was first applied, 257 tuns of coke were required to make 32 tuns of iron in the furnace by the cold blast. In this quantity of coke 2.57 tuns of sulphur were introduced. When the hot blast was applied and the air heated to 300° Fah., 164 tuns of coke only were required; and when the blast was heated to 600° Fah., 72 tuns of coke were sufficient, which reduced the quantity of sulphur from over two tuns to .72 of a tun in making 32 tuns of pig metal. The coke contained one per cent of sulphur, which is less than is found in the coke used in very many of our American iron-works. By such facts we have indubitable evidence of the benefit of the hot blast in smelting iron with fuel containing sulphur. The decrease of the quantity of sulphur going into the furnace also effects a saving of lime, as a quantity of lime exceeding the amount of sulphur is always required and used to nullify its effects to a certain extent. If then, as some contend, a better quality of iron is produced by the cold than the hot blast, it would appear that this subject requires further practical investigation to get at the root of the evil.

It has been found that the yield of iron in furnaces is increased, by raising the pressure of the blast. Furnaces that yielded 24 tuns per day under a pressure of 4 lbs., in the blast, have increased their yield to over 30 tuns by doubling the pressure. This is also a source of economy, but how high the pressure may be carried with safety has not been determined. Great improvements have yet to be made in the manufacture of crude iron from the ores.

THE SAILING OF THE "GEORGE GRISWOLD" WITH PROVISIONS FOR THE LANCASHIRE SUFFERERS.

A scene of unusual interest was witnessed in our harbor on the morning of Friday, January 9th. The occasion was the sailing of the new and beautiful ship, *George Griswold*, freighted with a precious cargo of provisions for the relief of the suffering operatives of Lancashire, England. A large number of our most distinguished citizens were congregated on board the vessel prior to her sailing; and after the Treasurer of the International Relief Fund Association had made his financial report, some very interesting addresses were made by clergymen of our city, who had been invited to take part in the ceremonies. The remarks of the Rev. A. D. Smith, D.D., of this city, were specially appropriate and felicitous; and we regret that our limited space will not admit of our reporting them.

The Treasurer's statement showed that some $108,000 had been contributed through him; besides some $30,000 which had been subscribed through the Corn Exchange Association. After purchasing the provisions for the cargo of the *George Griswold* (consisting of 12,236 bbls. of flour, 315 boxes of bread, 125 bbls. of biscuit, 50 bbls. of pork, 50 bbls. of beef, 167 bags of corn, 102 boxes of bacon and a few tierces and bags of rice, &c.), the Treasurer said there was left in the treasury a balance of over $30,000; this latter amount, with such donations as may still be made, will be soon expended, and another cargo—of greater or less dimensions, according to the liberality of our people—will soon follow the *George Griswold*.

The Lancashire cotton manufacturers, as a class, have amassed princely fortunes; and we rejoice to learn that they are now liberally sharing their means with their suffering operatives. At a public meeting held in Manchester on the 2d ult., £130,000 ($650,000) was subscribed, and many have pledged themselves to continue their contributions. This conduct has commanded the respect of the civilized world, and has made our own people assist the more heartily in their "labor of love." The people of Lancashire, England, have always exhibited a degree of love for free institutions, and we most deeply sympathize with them in their present distressing emergency.

We hope the good ship will have fair winds and a safe passage on her errand of mercy, and that many hearts may be made glad by the distribution of her precious cargo.

THE rough diamond is called bort, and the "points" used for glass-cutting are fragments of the borts.

THE LOSS OF THE MONITOR.

The recent naval disaster off Cape Hatteras, in which the nation was deprived of a vessel which possessed an historic interest, calls for some more decided expression of opinion than it has yet received. We have considered it necessary for the defense of our shores that we should have iron-clad vessels. Congress appropriated $13,000,000 to arm and equip such defenses, and we have at this writing four turreted batteries, one iron-clad frigate, and one iron-clad gunboat or sloop ready for active service. The first four are Ericsson batteries, counterparts (according to the inventor) of each other. The defects in common with the merits of one are repeated in the whole. To reverse the order of our statement, their merits are chiefly impregnability, their defects unseaworthiness. This was discovered in the first voyage of the *Monitor*, and has ever since existed in her, culminating in her total loss. The peculiarities of these vessels consist in the modified application of Timby's principle of a revolving tower combined with a hull having projecting armor shelves, or in other words, wide guards. The tower is, as yet shot proof, and the guards secure the hulls proper from damage by rams or shot. All other qualities have been sacrificed to obtain these. They are unventilated except artificially; they are dark and gloomy below; and the quarters for the officers and men are unfit for habitation. The engines and boilers are good, with a few exceptions. The boilers are Martin's patent, to which, if properly made, there is no objection, save in the case of a tube blowing out; they are then useless until the hole in the tube sheet is plugged. The *Monitor* was well provided with pumps, but they were unable to save her.

Upon the occasion of her victory over the *Merrimac* in Hampton Roads, the nation immediately ran mad over turreted batteries. The result was the building of nine *Monitors* and the projection of several others of larger dimensions, having some important modifications. The public are not informed of the nature of these alterations. One thing is certain—the loss of the *Monitor* was due to the large upper area of her deck, raft, or whatever name it may be dignified with, which was exposed to the force of the sea. And it is further clear to any one, who has ever been out of sight of land, that no vessel built on this principle can by any possibility live in a severe storm. The peculiarity of the *Monitor* is the overhanging armored deck; now a steamboat, with the narrow guards which it has, could not live in such a sea as the *Monitor* went down in, unless the shock of the waves was abated by sponsons or their equivalent underneath; even then her safety would be much imperiled. But here, in the face of all precedent, we have a battery going outside in one of the most dangerous places on the coast, with a bow overhanging a hull built of half-inch iron, for 14 feet, and projecting at the stern for 34 feet. We have cited the example of a steamboat as possessing features in common with the *Monitor* which admitted of comparison, but the steamboat has buoyancy which permits her to ride over a sea, whereas the *Monitor* has a very limited degree of this quality, in fact so little that she did not answer to the lift of the waves at all, but rose reluctantly on one crest and bored stubbornly through the succeeding one. Instead of taking the water like a duck she took it like a diver. Now we cannot think that Captain Ericsson, when he commended the sea-going qualities of these vessels, ever entertained the idea of subjecting the *Monitor*, at least, to such an ordeal as this. The strength and thickness of the hull is not sufficient to encounter any such blows as it must have received; and the fact that the shot and shell rooms were stowed to their utmost capacity with these dead weights, added to the *Monitor's* unseaworthiness. The weight of the ponderous turret attached to the raft made a hammer, that as the battery rose and fell sluggishly on the waves shook off the thin sub-structure in a very few hours. As a means for harbor defense the Ericsson batteries possess qualities which are undoubtedly good; but for rounding Cape Hatteras in mid-winter we may be permitted to question their fitness. Precisely how far the objectionable features in the old battery are perpetuated in the new ones is uncertain; the overhang at the bow and stern has been reduced,

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but the fatal defect of the guards still remains. This itself can be remedied by hips or sponsons, but as the vessels with these attachments and their present engines would not steam more than three miles an hour, they would be of doubtful utility in a sea-going point of view.

It is urged by a daily paper that the *Monitors*, while being conveyed from point to point on the coast, should have all their hatches battened down and caulked, and every air-hole and crevice rendered water-tight. "Then," says this oracle, "they would not sink." The writer is evidently under the impression that the turret performs the office of a funnel through which the water was shipped, that occasioned the disaster; but if we may be allowed, we will say that if the *Monitor* had possessed the buoyancy which a sea-going vessel ought to have, all the water in the Atlantic Ocean could not harm her. That the *Passaic* and *Montauk* went through to their destination we have ample proof, but the former was at one time in great peril; if we may believe the reports received, the *State of Georgia* was obliged to go about on her course and run before the wind with the battery; the water in the fire-room of the *Passaic* was at that time three inches deep.

There is a responsibility resting on some one in this matter. We have no disposition to criticize any of the *Monitor's* officers; that they acquitted themselves well and nobly under the trying circumstances to which they were exposed is fully apparent; but upon whom should fall the burthen of ordering a little vessel, such as was the *Monitor*, around the most dangerous part of the coast in mid-winter?

PROFESSOR JAMES RENWICK.

On the evening of the 12th inst., Professor James Renwick, L.L.D.—one of our most distinguished citizens—was "gathered to his fathers," at the age of 71 years. He was a graduate of Columbia College, in this city, in which institution he was professor of chemistry and physics for several years. He was favorably and extensively known for his attainments in science, especially mechanics, and was the author of several publications of a scientific character, such as a "Treatise on the Steam Engine," "Practical Application of Mechanics," "Outlines of Natural Philosophy," "Outlines of Geology," &c. He was also the author of several biographies of distinguished American mechanics, such as that of Robert Fulton and David Rittenhouse. As a writer upon such subjects he was distinguished for perspicuity and brevity. In the survey of the north-eastern boundary between Maine and New Brunswick, upon which the Ashburton Treaty was based, he was one of the commissioners. He was generally regarded as a father of those mechanic institutions in our country which have for their objects the advancement of the practical sciences, and the rational elevation of our mechanics. In all mechanical experiments he took a deep interest, and up to a very recent period was an active member of all such associations in this city. No man was more highly esteemed in New York for unostentatious demeanor combined with such extensive acquirements in solid knowledge.

STEAM ON CITY RAILROADS.

Any one who has ever watched a heavily loaded city passenger car, drawn by reeking and straining horses, cannot but pity the brutes, and wish that some other means could be adopted as a motive power. We have a remedy at hand; why then should we not use it? The introduction of steam, to do the work of human muscles in quenching fires, has been so rapid, and the good results derived are so apparent, that the number of hand-engines are decreasing every day; those who would multiply them evince only an opposition to progress and natural reform, which happily does not prevent the adoption of the new agent. We think that if any of the railroad companies were to introduce dummy engines in the place of horses, they would soon find many advantages arising from their use. In the first place, although the prime cost is more than horse-power, they are not so expensive to keep in repair, and to feed with coal as horses are to feed with oats or hay. They can be more easily managed, take less room in the track, and in short their advantages more than compensate for their demerits. These demerits are said to be a liability to frighten horses by their uncouth appearance. This idea is a wholly visionary one. The engines can be all enclosed in the car, and if horses do not now shy at these, they certainly will not hereafter, provided steam be employed. The Broadway railroad is progressing; let this company be the first to introduce steam and they will certainly be benefited by it.

EXPLOSIONS OF STEAM BOILERS.

Upon no other subject are philosophers, engineers and men of science generally, so much exercised and so much at variance as in their theories respecting the causes of steam boiler explosions. No sooner does some new opinion appear, or some new agent is asserted as the dangerous element, than a boiler explodes under circumstances which set the savans' opinions aside, and force them to go to work at investigating the subject over again. Boilers have burst under every possible circumstance and in every condition—while the engines which they have driven were at work and while they were quiescent—with low steam and high steam—with water and without water, and under mysterious circumstances apparently the most impenetrable. Yet the world is just as much in the dark as ever. Formerly it was a generally received opinion that the contact of comparatively cold water with an overheated plate, generated an excessive amount of vapor of an especially dangerous character, the expansive force of which no form of boiler nor any diameter of safety valve could operate against effectually. So generally was this opinion received, that all explosions were at one time attributed to it, and the engineer who was so fortunate as to survive his disaster, was universally discredited when he asserted that there was plenty of water at the time of the accident.

But lo! certain inquisitive men—and it is to them that science owes all her discoveries—quietly take a boiler, heat it to redness, and then inject water in quantities. So far from blowing it up, the vapor only discharges itself through the safety valve with a mighty roar!

This theory, as a universal and general source of danger, has gone to the clouds with the puffs of steam that destroyed its value. Perhaps the latest cause assigned as the mischievous force which destroys steam boilers by explosion is that of electricity. We find an account of an apparatus once used to ascertain the presence of this agent, and the manner of its generation in steam, in a philosophical work:—

"The apparatus was a common high pressure steam boiler, about three feet long and twenty inches in diameter, mounted on insulating pillars, and strong enough for a pressure of 200 pounds to the inch. The steam was suffered to escape by jets of a peculiar form, on the side of a box into which it was admitted by a cock. Faraday, in investigating the electricity of steam, found that dry steam gave no excitement, and that the electricity resulted from the friction of vesicles of water against the sides of the orifice. Hence the box contained a little water, over which the steam escaped, and was partially condensed. The jet had an interrupted passage to produce friction, and its nozzle was lined with dry box or partridge wood. The vapor escaped against a plate covered with metallic points, to collect the electricity, and ending in a brass ball insulated from the earth. The boiler was negative, and positive electricity was collected at the ball, provided the water was pure and free from grease. Turpentine, and other volatile essences reverse the polarity, while grease or steam from acid or saline water destroys all excitement. If the nozzle of the jet ends in ivory or metal, there is also no excitement. A boiler, such as is described, will develop in a given time as much electricity as four plate machines forty inches in diameter, making sixty turns a minute—a truly surprising result."

Thus it appears from high authority that electricity can only be obtained in steam under extraordinary circumstances. Certain features in the detective apparatus must be rigidly conformed to, otherwise it fails to appear. And what is sufficient to utterly nullify any value this theory may have had, is the fact that the presence of grease or steam from salt water prevents the electrical fluid from manifesting itself. As steam boilers are rarely, if ever, free from oil in small quantities, it will be seen that there need be but little danger apprehended from boiler explosions through electricity.

THE EXERTIONS OF OUR FRIENDS.

When we announced a few weeks since that we should be compelled by the unprecedented rise in printing paper, to increase our subscription price $1 per year and two cents per copy, we did it reluctantly, but felt that it was unavoidable. At the same time we called upon our friends to aid us by putting their shoulders to the wheel and using their influence among their acquaintance in behalf of the Scientific American. They have, we are happy to say, responded nobly, we are daily receiving large accesions to our subscription list, accompanied by letters full of complimentary allusions to our progress and the efforts we are making to not only keep up the standard of the paper as the only journal of its class in the country, but to carry it far beyond any distinction it has as yet achieved. The following letter was received from Mr. G. M. Holmes, of Gardiner, Maine, who accompanyed it with a list of twenty new subscribers:—

Messrs. Editors:—After much trouble I have succeeded in procuring a list of twenty names for the Scientific American for the ensuing year. With the same amount of labor, at any other time, I could have got at least forty names, but most of our mechanics have gone to the war, which makes the labor of forming clubs harder than ever before.

Allow me to thank you for myself and the club from this place, for the excellent matter with which the Scientific American has been filled for the past year. We think that your endeavors to improve the paper have been eminently successful; not that it was not always "first-rate," but that for the past year it has been better than ever.

Herewith I enclose the list with the amount of subscription. Geo. M. Holmes.

Gardiner, Maine, Jan. 1, 1862.

All we can say, in answer to Mr. Holmes's complimenting, is that we will endeavor to make the present volume more interesting than any previous one.

To a great number who have sent us lists of subscribers we are under obligation, and to the following persons we would render our special acknowledgment:—From Mr. F. Marston, of Houghton, Mich., we have received a list of 33 names; from the American Watch Company, Waltham, Mass., 24; Mr. H. N. Hemingway, of Des Moines, Iowa, 23; Mr. C. F. Hill, of Hamilton, Ohio, 23; Mr. S. Chadwick, of Wilkins, Pa., 23; Mr. E. Miller, Meriden, Conn., 22; Mr. S. Durivage, of Oswego, N. Y., 21; and from Messrs. T. Lyman, Sandusky, Ohio, and G. M. Holmes, Gardiner, Maine, 20 subscribers each. This last is, as the reader will discover, from the writer of the letter above quoted.

The press too have vied with each other in seeing which of them could say the most complimentary things. A recent number of *The Mariettan*, published in Marietta, Ohio, contains the following paragraph of praise:—

The Scientific American for last week, the closing number of the volume, contains, beside much other valuable matter, an illustrated article explaining the methods by which the *Great Eastern* was repaired. To engineers and hydraulic mechanics, if not to every curious and intelligent reader, this number of the Scientific American alone is worth the subscription price.

The Indianapolis *Daily Journal* thus praises us:—

The Scientific American has issued its prospectus for 1863, which will make the 8th volume of the new series. This publication has established itself as an authority in science and mechanics so firmly, that no man who desires to be "posted" in the progress of either can afford to be in ignorance of its opinions. It is conducted with great ability and judgment, is always ready with a well considered opinion for any topic of importance, yet is not dogmatic and overbearing, as papers devoted exclusively to some special subject are apt to be within their peculiar dominion; it is not too learned to despise entertainment, and its pages contain as much interesting miscellany, relating however to arts, inventions and discoveries, as any paper we know of, and it is illustrated profusely and admirably. So far as we know, Europe has no publication of the same class that compares with it in variety, excellence, and soundness of matter, or beauty of illustrations.

Really, gentlemen, if this kind of thing is to be continued, we shall be greatly embarrassed. We hope our readers will allow us this little corner to ourselves this week, and pardon the egotism which has prompted us to quote the good sayings of our friends.

Thus far the ice crop has been a complete failure this winter.

The annual clip of wool in California for 1862 was 5,600,000 pounds.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JANUARY 6, 1863.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

No patents were issued on Tuesday, December 30, 1862, which day occurred during the holiday week; the following list of claims includes all the patents granted since the last day of issue, December 23d.

37,266.—Wire-work for Fences, &c.—Augustus Algoever, New York City:

I claim the method of constructing wire fence and other wire-work, by first crimping a portion of the wires to be used, in such manner that being laid in a proper position for the work intended to be made, the indentations formed in them will admit of the insertion of straight wires, in such manner that they will form a lock to the whole when finished, substantially as described.

37,267.—Kerosene Lamp.—J. S. Atterbury and T. B. Atterbury, Pittsburgh, Pa.:

We claim, as a new article of manufacture, a glass collar, C, constructed and applied to a lamp in the manner and for the purpose substantially as set forth.

37,268.—Gold Washer and Amalgamator.—Mellen Battel, Albany, N. Y.:

I claim the mode of constructing and using two or more concave plates, with points or pins passing between each other; one or two or more of these plates are stationary, as shown, h and I, with rims forming the recess for the revolving plates, as shown, S and T, and one or two or more revolving plates are hung on a vertical shaft, on the under side of the stationary plates, as shown, E and F, substantially as before described.

37,269.—Anti-friction Car Wheel.—G. C. Beacher, Livonia, N. Y.:

I claim the application to railroad car wheels, of friction wheels or bands of wrought or cast iron, or any other suitable metal, and of any desired thickness, which will prevent friction in turning curves, by the independent revolutions of said friction wheels or bands, in the manner substantially as described.

37,270.—Chimney Cap.—L. F. Betts, Albion, Mich.:

I claim the peculiar arrangement of the two flues, B B, in combination with the openings or inlet passages, X X, "guide plate," D, and cowls, E E, substantially in the manner and for the purposes specified.

37,271.—Cultivator.—D. G. Blue, Winfield, Iowa:

I claim, first, The rear posts, when made shorter than the front ones, in combination with the use of an adjustable draft connection, substantially as and for the purposes set forth.

Second, The combination of the gage runners, d d, with the front posts, substantially as and for the purposes stated.

Third, The combination with the frames of the removable shield box, G, plow, H, and roller, I, substantially as set forth.

37,272.—Molding Chilled-iron Projectiles.—William Boekel, Philadelphia, Pa.:

I claim the described mode of molding chilled-iron projectiles, when the sand mold employed in combination with a chill for any convenient number of castings is formed by means of the molding irons, E and F, and their appendages, substantially in the manner and for the purpose set forth.

I also claim the employment of the ring, b, or its equivalent, in combination with the main body of the chill, for the purpose described.

37,273.—Canteen.—L. F. Bronnum, Brooklyn, N. Y.:

I claim, first, A canteen formed of concave cheek pieces of wood, attached together with a suitable packing or gasket at b, to keep the joints water-tight, as set forth.

Second, I claim a metal band surrounding the joints, in combination with the aforesaid cheek pieces, for the purposes and as specified.

37,274.—Rolling Mill Stand, &c.—W. F. Burden, Troy, N. Y.:

I claim, first, In a rolling mill which has its middle roller fixed and its top and bottom rollers adjustable, the manner substantially as described of applying the screws, E E, for the purpose of holding down the middle roll bearing, a'.

Second, In a rolling mill which has its middle roller fixed and its top and bottom rollers adjustable, I claim the arrangement of the screws, H G and E, with the top roller bearings, d f, and upper bearing, a', of the middle roller, substantially in the manner described.

Third, The combination of the bearings, I, screws, J, spur wheels, K, pinions, L, and key shafts, M, with the bottom roller, substantially in the manner as described.

Fourth, In a rolling mill which has its middle roller fixed and its top and bottom rollers adjustable, I claim the use of bearings, a a', of arch or analogous form, so that the bearings, I d f, may be adjusted within the arch thereof, and thus compactness secured, substantially as described.

37,275.—Percussion Fuse for Explosive Shells.—J. W. Cochran, New York City:

First, Weakly attaching the striker, D, to the cap, C, at the front end of the projectile, substantially in the manner and so as to secure the advantages herein set forth.

Second, The construction and arrangement of the parts, C D and F, so that the paris, F F, shall hook into the cavities, C C, in the manner and for the purpose herein set forth.

Third, Performing the triple function of first holding the striker directly connected to the front cap of the projectile until the discharge of the piece; second, partially overcoming the inertia of the striker before or in the act of their breakage, and third, absorbing the shock and inducing non-elasticity in the impact of the striker, on the rear face of the chamber, B, all by the employment of the same wires, F F, or their equivalents, arranged and bent as herein shown.

37,276.—Lamp Wick.—J. H. Connelly, Wheeling, Va.:

I claim, first, Making a hollow wick for lamps of a folded strip of muslin or other textile fabric, by uniting the edges of the strip by means of a paste or cement, insoluble in the oil or burning fluid which is to be burned by the wick.

Second, Inserting in an internally-wrapped hollow or tubular lamp wick, a strip or strips of porous paper, or raw cotton wrapped in paper, so as to give to the wick the requisite stiffness and shape, while increasing its capillary power.

Third, Making hollow or tubular lamp wicks of muslin, linen, or other suitable textile fabric without nap, and filled with porous paper, paper pulp, raw cotton or other substance possessing the requisite capillary property, substantially in the manner hereinbefore described.

37,277.—Folding Chair.—J. A. Dann, W. F. Dann and I. N. Dann, New Haven, Conn.:

I claim the arrangement of the slotted arms, A, the bolts, I, and standards, F, in combination with the legs, B C, with the several parts, operating substantially as and for the purpose specified.

37,278.—Apparatus for extracting Gold from Pyrites.—G. F. Deetken, Nevada, Cal.:

I claim the combination of the several devices and apparatus herein described, and operating substantially as illustrated and explained.

37,279.—Serving Ordnance.—J. H. Coon, Deposit, N. Y.:

I claim, first, The device composed of the two arms, 54 and 55, and the crank rod, 56, when combined and arranged in the manner hereinbefore described, and operated by the crank, 59, so as to move the rammer, 60, for the purpose set forth, and in the manner indicated.

Second, The device composed of the arm, 20, and the two arms, 34 and 35, the chains, 39 and 40, in combination with the rods, 66 and 67, and the cradle, 75, and the latice elevator, 72, all combined with each other in the manner before described, and operated by the crank rod, 28', for the purpose of lowering the forward end of the breech, 33, and elevating the cradle, 75, simultaneously with each other, as hereinbefore described and set forth.

Third, The combination of these two motions with each other, by means of the machinery hereinbefore described, so as to cause the depression of the breech, 33, the elevation of the cradle, 75, and the ascent of the rammer, 60, simultaneously, together with all the minor and subsidiary operations, as hereinbefore described and for the purposes set forth.

37,280.—Railroad Car Axle.—S. H. Dubois, of Buffalo, N. Y.:

I claim forming a ball journal on the inner end of each pair of axles, in combination and arrangement with an appropriate journal box, having a central support upon the track, for the purposes and substantially as described.

37,281.—Coal-oil Burner.—M. B. Dyott, Philadelphia, Pa.:

I claim a lamp burner constructed of two parts, A D, connected together by slotted spiral arms, G, and pins, d, arranged substantially as shown and described, to admit of the raising and lowering of the part, D, cone, E, and chimney, for the purpose set forth.

[The object of this invention is to obtain a coal-oil lamp burner of simple construction, which will admit of the wick being exposed for the purpose of lighting and trimming it without detaching either the cone or chimney from the burner.]

37,282.—Artificial Leg.—T. F. Englebrecht, New York City, R. Boeklen and W. Staehlen, Brooklyn, N. Y.:

We claim, first, The combination of the two pieces, B and C, which form the exterior of the lower leg, substantially as herein described for the purpose set forth.

Second, The construction of the artificial foot with a cavity, m n, in the place occupied by the instep of the natural foot, and with flaps, F, and a lace, n, or their equivalent, to receive and confine a packing, p, substantially as and for the purpose herein described.

Third, The construction of the ankle joint with a ball and socket, or cup and spring, combined to operate substantially as herein described, and dispense with the use of stops or other bearings than the ball and its socket or cup.

Fourth, The construction of the joint of an artificial limb in such manner substantially as illustrated in Fig. 7, that the rigid parts connected by the joint do not lap over each other, but leave the opening between them protected by a surrounding spring.

Fifth, The construction of the rigid portions of an artificial limb of plate metal, having corrugations, the length of which runs lengthwise of the limb, substantially as and for the purpose herein specified.

37,283.—Railroad Car Spring.—J. W. Evans, New York City:

I claim, first, the peculiar form and construction of the intermediate un-elastic plate, c, as regards the progressively-increased length of lip in each, according to the number of springs in each group, and the ogee recess, c'', near the angle.

Second, Suspending and holding the elastic plates together at the centres and edges without fixed fastenings, as described.

Third, The combining and arranging the box or cover, D, with the other parts so as to hold together the whole as a complete spring with or without a bolt, and without any fixed fastenings of the working parts.

Fourth, The combining and arranging the elastic and non-elastic plates, with the above-described manner of hanging the elastic plates loose at their centres, thereby rendering fracture or tearing of the plates almost impossible.

37,284.—Wringing Machine.—Thomas Farrington and Lewis White, Washington county, Vt.:

We claim the thumb-screws, F, the rod, B, the slot, c, the spring, A, and the adjustable bearing, E, arranged in the manner and for the purpose herein fully set forth and described.

37,285.—Currier's Knife.—George Featherston, Ansable Forks, N. Y.:

I claim the combination of the cross handle, c, with the blade, b, having upon it one or more double cutting edges, when said handle is arranged with its axis perpendicular to the surface of the blade, or nearly so, as herein specified.

37,286.—Seeding Machine.—William Finley, Schoolcraft, Mich.:

I claim, first, The box, H, suspended underneath the seed box, F, by a central pin or bolt, i, and provided with the inclined chutes, h, as and for the purpose specified.

Second, The sleeve, L, provided with the loose collar, M, and bars, P, in combination with the fixed perforated plate, o, and ratchet pulley, Q, all arranged as and for the purpose herein set forth.

[This invention relates to an improved seeding machine, of that class designed for sowing seed broadcast, and consists in an improved seed-distributing device, whereby a greater or less quantity of seed may be sown on a given area, as desired, and the seed sown in an even manner. The invention also consists in a novel arrangement of parts for throwing the seed-distributing roller in and out of gear to render the machine operative and inoperative, when desired, and the invention further consists in a certain arrangement of means for adjusting the discharge portion of the seed-distributing device, whereby an even distribution of seed is insured on inclined ground.]

37,287.—Boot and Shoe Sole.—Charles Goodyear, Jr., New York City:

I claim as a new manufacture, boot and shoe soles and parts of soles, composed of vulcanized india rubber, or other vulcanizable material, and wire cloth or its equivalent, substantially as herein described.

37,288.—Machinery for Drying and Finishing Tubular Knit Fabrics.—William K. Green, Jr., Amsterdam, N. Y., and W. M. Pawling, Hagaman's Mills, N. Y.:

I claim, first, The combination or arrangement together for conjoint use of an open hollow support for the tubular web, an apparatus for producing a blast of air, and a device for progressively drawing the tubular web from the said hollow web-holder, substantially as herein described, whereby the tubular web may be progressively dried by a blast of air from the inside, in the manner herein set forth.

Second, The combination of a hollow web-holder, an apparatus for producing a blast of air, a device for progressively drawing the tubular web endwise from the said web-holder, and an internal web-expander, substantially as herein described, whereby the tubular web may be progressively stretched transversely and lengthwise, and simultaneously dried by a blast of air from the inside, in the manner herein specified.

Third, The combination of a suitable support, A, for the long piece of washed tubular web, a pair of compressing draft rollers, E E', and an internal web-spreader, E, of a flattened form, and arranged with its rear end, g, Fig. 3, in the bight of the said draft rollers, substantially as herein described, whereby the tubular web may be progressively stretched flat widthwise and lengthwise, and compressed or calendered in such expanded condition, as herein set forth.

Fourth, The herein-described arrangement of a flat web-spreader, E, in combination with calendering rolls, E E', a hollow web support, A, and a blower, C, whereby the tubular web may be progressively dried and simultaneously stretched flat widthwise and lengthwise from the inside, and calendered while thus expanded, as herein set forth.

Fifth, The arrangement in combination of a support, A, for the long tubular web, a flat web-spreader, F, a pair of compressing draft rollers, E E', and an incumbent take-up roller, I, substantially as herein described, whereby the tubular web may be progressively stretched transversely and longitudinally, and calendered and wound into a roll in such expanded condition, as herein set forth.

Sixth, The arrangement in combination of a device, C, for producing a blast of air, a hollow web-holder, A, a flattened web spreader, F, draft rolls, E E', and an incumbent take-up roller, I, substantially as herein described, whereby the tubular web can be simultaneously dried and stretched laterally from the inside, and compressed and wound into a roll in such expanded condition, as herein specified.

Seventh, The arrangement of friction wheels, o o, on the web expander, F, combined with a web support, A, and draw-off mechanism E E', substantially as and for the purpose herein described.

37,289.—Manufacture of Illuminating Gas.—W. H. Gwynne, White Plains, N. Y.:

I claim obtaining illuminating gas from coal and wood, placed together in a retort in manner and purporting and treated substantially as described.

37,290.—Lock.—William Hall, Brookline, Mass.:

I claim the combination and arrangement of one or more studded key slides, N N, a corresponding number of tumblers, K K, and catch-lever, M, and the auxiliary slide, L, or its equivalent, the whole being applied to the main bolt substantially as specified.

And I also claim the arrangement and application of the main bolt B, with its key slides, N, tumblers, K, and catch-lever, M, and slide, L.

Also, The combination and arrangement of the auxiliary bolt, O, and its actuating apparatus (or retracting spring and system of levers operated by the knob) with one or more studded key slides, N N, a corresponding number of tumblers, a catch-lever, M, and a slide, L, combined with the main bolt.

Also, The combination and arrangement of the tooth, z, and the notches, a2, or mechanical equivalents therefor with the auxiliary bolt and its system of key slides.

Also, The application of the auxiliary bolt to its supporting lever or to the lock, so that the said bolt and either of the key slides, when in engagement, may be capable of being moved together in manner and under circumstances substantially as specified.

Also, The key as constructed with its bits separately revolvable on a pin, in order that either extremity of each bit may be employed in operating a key slide.

37,291.—Grain Distributor.—L. P. Haradon, Independence, Iowa:

I claim, first, The telescopic tube, A, provided with the box, C, and placed on an inclined framing, B, which has a series of spouts, D, attached in combination with the cord or chain, E, attached to the box, C, and a windlass provided with a ratchet, I, and pawl, J, or an equivalent device for drawing up the box, C, in line with the several spouts, D, all arranged as and for the purpose specified.

I further claim the valve, L, in combination with the two inclined spouts, C' C'', and the cord or chain, N, arranged with the pulley, O, loaded arm, P, and the loaded lever, M, as and for the purpose specified.

[This invention relates to a new and improved device for distributing grain, chiefly from elevators, into different bins in the upper part of the building—the parts being so arranged that the grain may be discharged into different bins by adjusting the parts from the lower part of the building, thereby dispensing with the services of a person in the grain loft or apartment in which the bins to be filled are placed.

27,292.—Gauge Cock.—Henry Hise, Ottawa, Ill.:

I claim the attachment of a glass tube to the column, B B, in combination with the valve, D, and floating ball, I, when applied to a cock, substantially as and for the purpose herein specified.

37,293.—Printers' Press.—A. N. Kellogg, Baraboo, Wis.:

I claim, first, the method of delivering the printed work substantially as follows:—By the removal of the parts specified above as obstructing the free descent of the printed work; the spreading of the arms, a a, of the platen, A, the lengthening of the joint-rod, b, the inversion of the stop-arm, c, and the construction of the hinge, e, in said arm, c, the position and shape of the frisket bearers, g g, the position of the frisket screws, h h, of the springs, c c, and of arms, P P, the use of screw-connections at the ends of rod, i, and the flap, m.

Second, The apparatus for piling, wherever used, substantially as shown and described, to wit: The box, k, with lip, l, and throat, n, the adjustable back, o, and raised edge, v, the fly, p, arms, g g, shaft, r, crank, t, rod, w, wrist, y, and pivot, z.

Third, The arrangement for leveling and holding the platen, A, substantially as shown and described, to wit: The use of the shouldered screws, v w, and the caps, F F, with their fastenings, G G' G G'.

Fourth, The placing of the point of draft of the roller-frame forward of the center effected, substantially as follows, to wit:—By the use of the pivots, I, and the bar, m, in the positions shown.

37,294.—Tobacco-cutter.—Samuel Lee, Taunton, Mass.:

I claim the machine or slicer as constructed either with the cork squeezing jaws or the nut-cracking jaws or both arranged and combined with the levers and stand applied in manner and so as to operate together substantially as specified.

37,295.—Mold-box for Casting Propeller Wheels.—Wm. Lechler and J. K. Schupp, Cleveland, Ohio:

We claim making the mold-box for casting propeller wheels in sections, A A A A, substantially as described, each section to correspond to a wing or blade of said wheel, which sections when fitted together, with the molds in them will constitute a complete mold for a solid propeller wheel, substantially in the manner described.

We also claim in combination with the mold-box for a propeller wheel as herein described, the mold block or bed, D, substantially in the manner and for the purposes herein set forth.

37,296.—Composition for Gunpowder.—Henry Liebert, Norristown, Pa.:

I claim prussiate of potash, chlorate of potash, nitrate of soda or its equivalent, sawdust or its equivalent, sulphate of soda and sulphur or its equivalent, substantially as and for the purpose herein set forth.

37,297.—Saw-set.—John Madden, Youngstown, Ohio:

I claim, first, The male die, G, in combination with the female dies J J' and M, when constructed and operating substantially as and for the purpose set forth.

Second, I claim the peculiar form or shape of the teeth as shown in Fig. 7.

37,298.—Printing Floor-cloths, &c.—John Marchbank, Lansingburgh, N. Y.:

I claim, first, The printing of designs or patterns on oil and other floor-cloths by means of blocks provided with pins or projections arranged at such a distance apart and used in connection with a box containing cells supplied with different colored paints or with a pad or cushion supplied therewith, substantially as herein described.

Second, The feeders or devices for supplying the cells or the pad or cushion, H, with the necessary colors, the same being composed of plates, E E' E'' E''', provided with pins, d, substantially as set orth.

Third, The perforated card or paper, D, as a means for disposing or distributing the pins, d, in the plates, E E' E'' E''', so as to supply the cells, b, of the box, B, or the pad or cushion with the several colors that they may be taken up by the blocks to print the desired design or pattern.

37,299.—Air Engine.—Henry Messer, Roxbury, Mass.:

I claim, first, The combination with a stationary pump piston of a pump cylinder attached to and having a reciprocating movement corresponding with the working piston substantially as and for the purpose herein specified.

Second, The arrangement of the valve chest, H, valves, I J, and the movable front plate, u, of the chest, whereby provision is made for getting at the valves substantially as herein described.

37,300.—Window-blind Fastening.—Daniel Mills, Paterson, N. J.:

I claim the combination and arrangement of the adjustable hinged fastening, a b d, with a window blind, substantially as and for the purpose described.

37,301.—Lamp.—S. G. Morrison, Williamsport, Pa.:

I claim the distributing tube, B, with the composite wicks, C C C, and flame wick, d d, in connection with the conducting wick, A a, so as to lessen the amount of oil raised by capillary attraction to the flame, the amount of wick exposed to the oil reservoir being about one-third of that supplying the flame, the whole constructed and operating substantially as specified.

[This invention consists in securing the chimney in an elastic clamp which is connected to the lamp burner by a pivot or joint and has a spring connected to it and so arranged that the clamp may be held in a horizontal position in order to secure the chimney properly on the burner, and also held in an upward position when the chimney is detached from the burner or thrown off from the cone or deflector thereof.]

37,302.—Trunk Engine.—Thomas Northey, St. Mayben Parish, England:

I claim the combination with a trunk engine of a valve, G, applied and operating substantially as and for the purpose herein specified.

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37,303.—Sugar Evaporator.—Oscar B. Olmsted, Rockton, Ill.:

I claim, first, The combination of the auxiliary furnace, E, with the main furnace, A, when arranged and operating as described for the purpose set forth.

Second, Constructing the main furnace, A, with a double bottom substantially as and for the purpose specified.

37,304.—Machinery for Feeding Carding Engines.—S. R. Parkhurst, New York City:

I claim, first, The cylindrical rotary feeding table, g, to supply the fibrous material to the cleaning or carding machine substantially as specified.

Second, I claim the roller, l, in combination with the said cylindrical rotary feeding table, g, for the purpose and as specified.

Third, I claim the belts, p p, screen, r, and curved guard, s, in combination with the said cylindrical rotary feeding table, g, for the purposes and as specified.

Fourth, I claim a series of toothed cylinders in combination with the toothed feeding table, for opening, combining and separating the fibers as specified.

37,305.—Skate.—J. L. Plimpton, New York City:

I claim, first, The attaching or applying of the rollers, E, or runners, E°, to the stock or foot-stand, A, of a skate in such a manner that said rollers or runners will be turned, cramped or adjusted, so as to run the skate in a curved line to the right or left by the turning or canting of the foot-stand, or stock, A, as set forth.

Second, The plate, H H, provided with hooks, g, at their ends and racks, f, at their front edges in combination with the spring, I, and plate, G, the latter being applied to the stock or foot-stand, A, and provided with slots, e, at its ends, and all arranged as shown to form a fastening at the front part of the skate, as herein shown and described.

[This invention relates to an improvement in the attaching of the rollers or runners to the skate, whereby the former are made to turn or cramp like the wheels of a wagon and facilitate the turning of the skate—there being two pairs of rollers or runners to each skate. The invention also relates to an improved fastening for securing the front part of the boot or shoe to the skate.]

37,306.—Eyeleting Machine.—J. F. Sargent, Boston, Mass.:

I claim, first, The combination of a hopper with two side bars and cover and a vibrating bottom constructed, arranged and operating substantially as specified.

Second, The under-cut formation of the sides of the chute provided with the guard or deflector and a depression in the side boundary of the chute when arranged and operating together substantially as and for the purpose specified.

Third, The arrangement of those parts of the sets which operate on the ends of the eyelets relatively to the pivots or fulcrums from which the sets are vibrated substantially as described.

Fourth, In combination with a hollow set, a feeder having a point or points suitable for entering into an eyelet or eyelets, and motions forward and backward for the purpose of feeding, and motions toward and from the eyelets for the purpose of engaging with them; said combination operating to place successively and at the proper times one eyelet after another on the hollow set and at all other times in conjunction with the set to prevent the eyelets from being placed thereon.

Fifth, The combination of a punch with an eyelet set, so that the punch will operate to form holes in advance of the place where the set operates and to space the distances between the holes substantially as described.

37,307.—Refrigerator.—J. C. Scholey, New York City:

I claim the movable partition, C, when used in combination with a refrigerator and so arranged that the partition can be moved to and fro, substantially as and for the purposes as set forth.

37,308.—Machine for Bending Corrugated Sheet Metal.—S. J. Seely, Brooklyn, N. Y.:

I claim bending corrugated sheet metal into the form of a cylinder which is corrugated around its circumference by means of three adjustable rollers having corrugated circumferential surfaces such as described, said surfaces meshing into one another and also revolving in concert and with an equal and positive motion, all substantially as herein set forth.

37,309.—Cultivator.—D. S. Stafford, Decatur, Ill.:

I claim the suspended and dually-connected arrangement of single plows in combination with each other and with a wheeled carriage so as to operate substantially as described.

And I claim also in combination with the suspended and connected arrangement of plows in pairs, so constructing and arranging the carrying frame thereof that it may be inclined by the driver so as to operate substantially as specified.

37,310.—Beehive.—J. B. Strickler, Milford, Ill.:

I claim the arrangement and combination of the drawers, E F G, with the compartments, K L M, drawer, P, slotted or perforated slide, O, and frame, Q, all arranged with in the case, A, to form a new and improved bee-house as herein set forth.

I also claim the bait receptacle, I, in the drawer, G, in combination with the compartment, J, for the purpose of entrapping the queen and removing the surplus colony from the bee-house as herein set forth.

I also claim the sliding comb-supporting rods, R, arranged as shown for the purpose specified.

[The object of this invention is to obtain a bee-hive or rather bee-house of larger dimensions than an ordinary hive, by which large quantities of honey may be made in a single season, and at the same time afford good facilities for ventilation and the capturing and destroying of the moth, as well as facilities for abstracting the spare honey from the hive and the taking of the young queens therefrom in order to multiply colonies without swarming.]

37,311.—Seeding Machine.—Henry Thomason, Lafayette, Ind.:

I claim, first, Attaching the shovels or shares, J, to plates, w, fitted loosely on pendent rods, e*, attached to the plates, K, of the frames in which the seed-boxes are secured in connection with the plates, K, having the plates, w, connected to them by rods, f* and the former secured to the beam, a′ of the frame, A, all arranged as and for the purpose of turning the shovels or shares as specified,

Second, The manner of constructing the seed-distributing wheels, q, as described, to wit: by cutting slits in circular disks and bending the portions of the disks between the slits obliquely with their shafts so as to form buckets or flanges to act upon or raise the seed and discharge the same from the seed-boxes as set forth.

Third, Securing the plates, v, of the shovels or shares, J, to the plates, w, by means of joints, a*, substantially as shown in connection with the staples, b*, and wooden pins, d*, and the slots, c*, in the plates, v, all arranged to operate as and for the purpose herein set forth.

[This invention relates to a new and improved seed drill of that class designed for sowing seed either for a distinct crop on ground specially prepared for it or for sowing it between the rows of standing corn or other crops which are grown in hills or drills.]

37,312.—Saw.—W. G. Tuttle, Geneva, N. Y.:

I claim the use of alternate triangular pairs of cutting teeth, a a′, separated individually by the narrow slit, b, and with their points, resting closely together; in combination with the intermediate, single, straight, clearing teeth, d, the whole arranged on a single saw blade, and operating substantially as and for the purpose herein set forth.

37,313.—Inkstand and Pen-rack.—Sylvenus Walker, Boston, Mass.:

I claim, first, A fountain ink-stand and pen-rack combined, all made of one piece of glass.

Second, I claim in combination therewith, the horizontal grooves, a b c, reservoir, B, dipping-cup, A, convex bottom, E, neck, C, aperture, e, and hood, f, when combined and arranged as described for the purposes set forth.

[The object of this invention is to obtain a simple, unique and economical device that will serve as an ink-stand and pen-rack combined.]

37,314.—Composition for Lemonade.—A. Warner, Cleveland, Ohio:

I claim the herein described compound, consisting of soap, sugar, oil-of-lemon, tartaric acid and citric acid, prepared and combined substantially as and in the proportions herein set forth.

37,315.—Shoe Brush.—R. M. Whipple, Cambridge, Mass.:

I claim the combination of the scraper with the brush constructed and operating substantially as herein described.

37,316.—Chimney Attachment for Lamps.—John Zengeler, Chicago, Ill.:

I claim the combination of the friction roller, e, with the pivoted arm, b, spring clamp, B, and curved spring, H, all constructed, arranged and employed in connection with the lamp top, A, in the manner and for the purposes herein shown and explained.

37,317.—Bolting Flour.—W. F. Cochran (assignor to himself and Warder & Child), Springfield, Ohio.

I claim, first, Bolting the meal over a series of reels covered with cloth of increasing fineness in combination with a blast, substantially in the manner described.

Second, Running the offal through the entire series of reels substantially in the manner described, for the purpose of making the flour bolt more freely.

Third, Re-bolting the "white middlings" flour after re-grinding and mixing them with offal substantially in the manner described.

Fourth, Conducting the flour made upon each reel into a separate compartment substantially in the manner described for the purpose of making a variety of grades, or of mixing them in any proportion desired as set forth.

37,318.—Bolting Flour.—W. F. Cochran (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, first, Returning the blast air to the fan, substantially in the manner and for the purposes described.

Second, Regulating the quantity of warm air returned to the fan by means of a cast-off valve in the return air-trunk, for the purposes set forth.

Third, Controlling the strength of the blast by means of valves in the air-pipes, substantially in the manner and for the purpose described.

37,319.—Bolting Flour.—W. F. Cochran (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, first, Feeding the meal to the bolting-reel by means of a pump, for the purpose set forth.

Second, Making steps or off-sets, 1 2, upon the plunger of the pump, for the purpose set forth.

Third, The combination of the plunger, d, and screw-rod, d3, substantially in the manner described for the purpose of regulating the amount of feed to the reel.

Fourth, The combination of a flaring feeding-spout with a pump, substantially in the manner described for the purpose set forth.

37,320.—Bolting Flour.—W. F. Cochran (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, first, The combination of the reel-shaft, E, bell-mouthed air-chambers, E4, and reel-arms, E1, with the perforated tubes, E3, as and for the purpose described.

Second, The combination of the stationary reel-head, e, revolving ring, e1, and flanges, e2 e2, when constructed and arranged as herein described for the purpose set forth.

Third, Forming a dead-air chamber at the tail end of a bolting-reel, into which the offal may fall and thus be prevented from specking or mixing with the superfine flour, and preventing the flying dust from the flour chamber from passing into the offal, substantially in the manner herein described.

Fourth, The combination of a dividing-board or partition, E7, and flanged ring, e1, with a bolt-reel, substantially as described for the purpose set forth.

Fifth, Conveying the fine flour from the bolting-reel to the conveyor or other receptacle by means of a valve or pump, F, which passes the flour freely, but prevents the escape of air, substantially in the manner described.

Sixth, The combination of the reel, E, valve shaft, F, and conveyor, N, substantially in the manner described.

Seventh, The combination of the valve-shaft, F, base-boards, f′, and adjustable concave blocks, f, as described.

Eighth, The combination of the slotted shaft, F′, reciprocating board or plunger, f2, channels, f, and brackets, f4, substantially as described.

Ninth, The combination of a pump trap or cut-off with the dead-air chamber, E9, substantially in the manner described for the purpose of discharging the offal therefrom.

37,321.—Bolting Flour.—W. F. Cochran (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, first, The condensing or collecting-chamber, H, when constructed, arranged and operating as described for the purpose specified.

Second, The combination of a collecting-chamber, H, and valve, I, substantially in the manner herein described for the purpose set forth.

Third, The combination of a collecting-chamber, a valve and a bolting-reel, substantially in the manner and for the purpose described.

37,322.—Machine for Pulverizing Quartz, &c.—Charles Howell, Cleveland, Ohio, assignor to Peter Hannay, Washington, D. C.:

I claim reducing minerals, bones and similar substances to powder by percussion, substantially as described, that is to say, by means of a rotating projector and an impinging surface, both enclosed in a case; the relations of the rotating projector and the impinging surface being such that the materials will not be pulverized by being crushed between them, but only by the percussion resulting from the sudden checking of the motion given to the materials by the one against the surface of the other, substantially as described.

37,323.—Packing Sheet Metal for Transportation.—Delaplain McDaniel, New Castle county, Del., assignor to himself and J. J. McCullough, Cecil county, Md.:

I claim making one or both of the two outside sheets larger than those between them, and bending over the edge so as to form a box or covering of the two outside sheets to protect the sheets between them.

37,324.—Folding Chair.—J. D. Merriam, Ashburnham, Mass., assignor to E. W. Vaill, Worcester, Mass.:

I claim as a new article of manufacture, a folding chair composed of curved pieces, A A and D D, rounds or cross bars, E B B F, flexible seat, G, back piece, H, and connecting bar, C, combined and arranged in the manner and for the purpose specified.

[The particular object of this invention is to obtain a chair of light and durable construction for camp use, and one which when folded will stand alone unsupported, and be of a compact and convenient form for transportation. It consists in uniting together the front and back legs which cross each other by a rigid and flexible connection, the former being simply a round passing through the legs at the point of intersection, and the latter a strip or piece of canvas duck or carpeting which is stretched and forms the seat of the chair when unfolded.]

37,325.—Blower.—Edward Suckow and Edward Habel, Oldham, England, assignor to Charles Suckow, Buffalo, N. Y. Patented in England, February 25, 1862.:

We claim, first, The arrangement and combination of an archimedian screw with a cylinder having catch wings, a′, upon the inside thereof, for the purposes and substantially as described.

Second, Placing and using the blades of an archimedian screw upon a conical and bill-mouthed hub, for the purposes and substantially as set forth.

Third, The combination of the conical disk, E, with the cylinder, A, and archimedian screw, for the purposes and substantially as set forth.

37,326.—Portable Writing Apparatus.—H. C. Whitten, (assignor to himself and J. L. Brown), Plymouth, Mass.:

I claim my improved portable writing apparatus as made with its folding tablet, D, and the body or main part, A, and cover, B, of its case, A2, arranged and applied substantially in manner and so as to operate as represented and described.

37,327.—Cheese Press.—John Aiken, Warner, N. H.:

I claim the particular combination and arrangement of the levers, b b b b b b b c c c c, bed, B, platen, G, with the cords or ropes, e e e e, and beam, F, substantially as set forth.

37,328.—Eyelet for Lacing Shoes.—Jacob Autenrieth, Philadelphia, Pa.:

I claim as an improved article of manufacture, a lacing eyelet made with a tubular projection or prongs, a a′, disk, b, and eye, e, as herein shown and described.

[This invention consists in the employment for the purpose of lacing shoes, of an eyelet having its eye projecting above the outer surface of the shoe, in such a manner that the lacing when the same has been passed through said eyes does no where pass below or under the edge of the leather, and the friction is so much reduced that the shoe can be taken off and put on with ease and facility.]

37,329.—Rammer Connection for Revolving Fire-arms.—Fordyce Beals, New Haven, Conn.:

I claim the combination of the pivoted bar, G, construced as set forth, with the axis pin, C, and the rammer lever, D, substantially in the manner herein shown and described.

37,330.—Operating Churns and Washing Machines.—J. T. Bever, Springfield, Ill.:

I claim the stand, A, post, c, lever, B, post, C, bar, D, and spring, E, arranged substantially as shown for the purposes herein set forth.

I also claim in combination with the parts above named, the seat, F, on the lever, B, and the foot springs, L L, on the platform, a, as and for the purpose specified.

I also claim the foot-piece, f, on bar, D, in combination with the hand-rod, g, when said parts are used in connection with the lever, B, post, c, and stand, A, for the purposes specified.

[The object of this invention is to obtain a simple and efficicent device which may be constructed at a moderate expense, and applied either to a clothes-washing machine or to a reciprocating churn, for the purpose of admitting of said devices being operated with but little labor.]

37,331.—Delineating Telegraph.—Chev. Gaëtan Bonelli, Milan, Italy:

I claim the employment, for producing the image of types or handwriting, of a number of conducting wires, when combined with two series of flexible, comb-like, metallic teeth or elastic conductors, arranged nearly close together, but insulated from each other, and with a movable platform or platforms carrying the conducting types or handwriting, and the chemically prepared paper on which the image is to be produced, the whole operating substantially as herein specified.

[In this telegraph the message is set up in metallic type, or written with a metallic ink upon non-conducting paper, or with an insulating ink on metallic paper, and placed in the circuit, and is copied by electricity upon chemically prepared paper at the stations to which it is to be sent.]

37,332.—Machine for Drawing Bolts and Spikes.—J. C. Chapman, Charlestown, Mass.:

I claim the within described machine for drawing bolts, consisting of the combination of the frame, A, the screw-shaft, B, with its foot-piece, D, and the jaws, E, arranged and operating as set forth.

37,333.—Tool Handle.—I. S. Clough, Brooklyn, N. Y., and J. N. Bunnell, Unionville, Conn.:

We claim in combination with the tool handle, the india-rubber cushion, applied as shown for the purpose specified.

37,334.—Machine for Edging, Slitting and Re-sawing Lumber.—A. Cushing, St. Johns, Province of New Brunswick:

I claim the combination of the feed table, E, and stand or platform, G, connected together, or so arranged as to be operated simultaneously as and for the purpose herein set forth.

[The object of this invention is to facilitate and decrease the labor attending the feeding or applying of lumber to sawing machines, for edging, slitting and re-sawing lumber, and to this end the invention consists in connecting a platform or stand to the feed table, in such a manner that the attendants will be carried along with the feed table as the latter moves back and forth, thereby greatly diminishing the labor of the attendants, and maternally expediting the work of the machine.]

37,335.—Saw-mill.—A. Cushing, St. Johns, Province of New Brunswick:

I claim, first, Feeding or operating the upper or pressure rollers of gang saws by a combination of means which will make them always work effectively and automatically upon all sizes and varieties of round logs with variable surfaces as well as flat timber, substantially as shown or by an equivalent arrangement.

Second, The lower feed rollers, D D, having their shafts, E, fitted in stationary bearings; in combination with the upper yielding and adjustable rollers, M M, when the same have their shafts, N, fitted in arms, O, connected to sliding frames, Q Q, arranged with the racks, s, and pinions, b, and both pairs of rollers operated through the medium of the gearing, I′ H G G L U U, as and for the purpose herein shown and described.

[This invention relates to an improvement in the feeding devices of saw-mills, and is designed to obviate the waste of lumber consequent on the puncturing, chafing and splitting of the same by the ordinary spiked or toothed rollers which are placed below the lumber.]

37,336.—Hooped Skirt.—C. H. De Forest, Birmingham, Conn.:

I claim the employment of the clasp, C, or its equivalent, in combination with the hoops and pockets, a, of the hoop-supporting tapes for preventing the displacement or derangement of the hoops in the pockets, substantially as herein before descried.

37,337.—Water Wheel.—Elias Dohner, Lancaster, Pa., and A. M. Bruckart, Brunnersville, Pa.:

I claim the combination of the short intermediate baskets, D, with the buckets, C, hub, A, and rim, B, all constructed and arranged in the manner and for the objects set forth.

[This is an improvement in turbine water wheels, and consists in a novel construction, combination and arrangement of buckets, which will avail more fully the percussive and gravitating force of the water, and permit its free discharge.]

37,338.—Hot-air Register.—Thomas Dowling, Salem, Mass.:

I claim the combination and arrangement substantially as described, of the case, A, the tube, F, and the perforated collar, D, with the floor, C, and its register, J, and the hot-air inlet pipe, B, whereby one or more air passages are so formed between the flour and the hot-air pipe, B, as to cause, while hot-air may be blowing out of the pipe, B, and from thence through the register, a current of cool air to flow downward through the collar, D, and the passage between the case, A, and the tube, F, and thence upward through the said tube, F, and the register, and commingle with the heated air discharged from the pipe, B.

I also claim the combination of one or more telescopic tubes, H I, with the register, d, the case, A, the tube, F, and the inlet pipe, B, the whole being so as to operate substantially as described.

37,339.—Evaporator for Saccharine Liquids.—F. D. Drake, Four Corners, Ohio:

I claim the arrangement of the flue, c, extending on one side of the furnace, A, from front to rear end, then back through the middle to the front end, and back again to the chimney at the rear end of the furnace, in combination with the pan, B, constructed and operating substantially as and for the purpose shown and described.

[An engraving and full description of this invention will be published in the next number of the Scientific American.]

37,340.—Machine for making Shoe Nails.—W. H. Field, Taunton, Mass.:

I claim the employment or use of a furnace, E, in combination with the cutter, A, of a shoe nail machine, and with the feeding tubes, D, constructed and operating substantially in the manner and for the purpose specified.

[This invention consists in the arrangement of a furnace in combination with the cutter of a nail machine, and with the plate from which the nails are to be cut, in such a manner that said plate while

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being fed to the machine passes through the furnace, and is presented to the cutter in a red-hot state.]

37,341.—Device for Canting or Turning Logs during the Process of Sawing them into Lumber.—Carlton Foster, Oshkosh, Wis. :

I claim the kook, Q, attached to a tackle, the chain, L, of which is connected to an adjustable shaft, F, operated through the medium of friction pulleys or wheels, D E, thrown in and out of gear, or connected and disconnected by means of levers, G H, so arranged that the former one, G, will have its fulcrum, a, in line or in the same plane with the tension or strain of chain, L, on shaft, F, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple, speedy and efficient means, whereby a single attendant may cant or turn and adjust logs upon a head-block or carriage of a saw-mill during the process of sawing them into lumber—work hitherto, in the sawing of large logs, requiring the aid of several hands.]

37,342.—Valve Gear of Steam Engines.—W. R. Greenleaf, Silver Creek, N. Y. :

I claim the combination and arrangement of the valves, valve stems or valve rockshafts, and of the two eccentric rods, c c′, attached to the same eccentric, substantially as herein described, whereby the one eccentric is made to operate the valves of both cylinders of a double engine, as herein set forth.

Second, The employment for operating the inner eccentric, D, of two sleeves, H I, the one moving around and the other sliding longitudinally upon the crank-shaft, the two combined by a spinal groove, i, and pin, j, and the whole operating substantially as herein specified.

37,343.—Steam Radiator.—L. M. Hills, New Haven, Conn. :

I claim the combination of the tube plates, H and I, the tubes, C, and plates E and F, when the same are constructed and joined with unyielding joints, in the manner and for the purpose substantially as herein set forth and described.

37,344.—Combination of Steam and Water Power.—Abraham Huffer, of Hagerstown, Md. :

I claim the combination of a steam generator or steam generators with a water wheel or water wheels, and chambers or a chamber for elevating water by atmosphere pressure, and driving a water wheel or wheels, substantially in the manner and for the purpose set forth.

37,345.—Grain Drill.—Joseph Ingels, of Milton, Ind. :

I claim, first, The use of double reversible intermediate gear wheels, substantially as shown and described, to communicate motion at any desired speed from the main axle to the seed delivery apparatus.

Second, The manner of attaching the moveable shaft, M, at any suitable position between the axle, b, and shaft, k, to adopt it to the different sizes or positions of the intermediate wheels.

The combination of the lever, W, and flange or cam, u′, with the pivoted bar, U, and wheel, L, to disconnect the said wheel with the shaft, k, by the act of raising the hoes.

Fourth, The concave, j, of the secondary or deliverary hopper, cast in one piece with cheeks, j′ j′, all as herein shown and described.

Fifth, The combination of the concave, j, inclined plate, j2, cheeks, j′, and feed wheel, K, all constructed and arranged substantially as herein shown and described.

Sixth, The movable bottom or gage plate, G, perforated with tapering apertures, g, in the described combination with the supporting brackets, G′, so arranged that the said brackets may cover any desired part of the apertures to regulate the delivery of seed as explained.

37,346.—Device for Tightening Window Sashes.—George Jones, Peeksville, N. Y. :

I claim the combination of the angle pieces, C C, thumb-screws, D D, and bearing plates, d d, applied respectively to the window frame and sash, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a simple device for tightening or securing window sashes in their frames, in such a manner as to effectually prevent them from rattling under the action of the wind, and thereby obviate the use of temporary wedges and sundry other articles when procurable, being inserted between the sash and the side strip of the frame to effect the result.]

37,347.—Blades for Knitting Machine Sinkers.—Luke Kavanaugh, Waterford, N. Y. :

I claim a wing or blade for sinker-burrs of knitting machines, having through it a hole or opening, b, arranged in respect to a yarn-guide, c, on the blade, substantially as herein described.

37,348.—Brick Machine.—J. A. Lafler, Albion, N. Y. :

I claim, first, The combination of the curved and yielding clod-crusher, F, with the press box, E, and the mold, G, in the manner herein shown and described.

Second, The combination, with the pallets, q, and bottom board, r, of the beveled side pieces, m, and the beveled division pieces, o, of the mold box, G, when the said side pieces are arranged to extend below the level of the pallets, all in the manner and for the purpose herein shown and described.

Third, The construction of the edges, n n, of the mold box, G, with recesses, s s, in combination with projections, t, upon the boards, r, all as and for the purpose herein shown and described.

37,349.—Coal-oil Lamp.—Almon Leach, Utica, N. Y. :

I claim securing the cylinder, H, perforated plate, J, and flange, K, to the burner, G, as shown, when said burner is screwed into the tube, B, and all used in connection with the cylinder or jacket, D, for the purpose herein set forth.

I further claim the combination of two reflectors, L L, formed each of concave and convex surfaces, h i, constructed together angularly with each other and placed in relation with the flame of the lamp, as herein specified.

[This invention relates to an improvement in coal-oil lamps, those which are designed to be used in railroad cars and other places where lamps are subjected to a jolting or vibrating movement.]

37,350.—Horse-power.—J. H. Lighter, Freedom township, Ill. :

I claim the application of two horizontal crown wheels, B B, placed on each side of the center of the horse-power, in combination with a single pinion, D, beveled each way from the center, and working between the two horizontal crown wheels, B B, as and for the purpose substantially as specified.

37,351.—Harvester.—D. B. Luckey, Bloomingburgh, N. Y. :

I claim, first, Balancing the cutter bar and finger bar by the weighted levers, b and K, and connecting them to the other means or devices herein set forth, so that when they come in contact with stones or other impediments they will be elevated in a vertical or nearly vertical direction, as described.

Second, In combination with a mower, I claim the lifting rake, arranged and operated in front of the cutters, substantially as set forth.

37,352.—Securing Soft Metal Packing to Projectiles.—H. F. Mann, Laporte, Ind. :

I claim providing around the circumference of shot, shell or projectiles, the bars, B B, which are separated from one another and isolated from the bottom of the packing groove and which extend from shoulder to shoulder of said groove and pass entirely through the soft metal packing; all in such a manner that the soft metal packing is held securely in place both longitudinally and in line with the circumference of the projectiles, substantially as described.

37,353.—Seeding Machine.—Patrick McGlew, Des Moines, Iowa :

I claim the scrapers, H H, attached to the bar, G, fitted in guides, g g, and connected to a lever, J, the whole constructed, arranged and operating in the manner and for the purpose herein set forth.

[This invention relates to a new and improved seeding machine of that class which are designed for sowing seed in hills and in check rows, such, for instance, as corn, sugar cane, cotton seed, &c,]

37,354.—Seeder.—C. E. Miller, Amelia, Ohio :

I claim, first, The seeding apparatus, consisting of the hopper, E, having a long transverse ventage, F, closable by the adjustable concavo-convex shield or register, G, and supported by the beveled staples, K, in combination with the spiked clod-crushing roller, B, arranged and operating in the manner specified.

Second, The described arrangement of the clod-crusher, B D, harrow, C, and seeding apparatus, E F G H I J K L, as and for the purpose set forth.

37,355.—Water Wheel.—J. M. Miller, Hamilton, Ohio :

First, In combination with the pulleys, A and B, I claim an endless chain of buckets, C, constructed as described, with overlapping wings, F, to prevent the waste or water, the whole operating in the manner and for the purpose set forth.

Second, I claim connecting the said buckets, C, by gudgeons, D′, fitting in eyes, D, the said parts being located directly over the center of the bucket when full and in other respects so arranged that each bucket shall be suspended in a perpendicular position, as explained.

37,356.—Breech-loading Fire-arm.—J. C. Nye, Cincinnati, Ohio :

I claim the arm, G, attached to the key or gate, C, substantially as described in the specification and shown in the accompanying drawings.

37,357.—Churn Dasher.—M. J. Palmer, Homer, N. Y., and H. R. Ingalls, of Groton, N. Y. :

We claim the manner of setting the slats, c c, across the dash from float to float with their side faces at an angle to the plane in which the dash revolves, when used in combination with said floats, a a, substantially as above described.

37,358.—Coffee and Spice Mill.—Charles W. Pierce, Oakhill, N. Y. :

I claim the adjustable plate or valve, G, placed in the hopper, E, in combination with the double-rotary grinder, A, placed within the case, C, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in hand mills, such as are used for domestic purposes for grinding coffee, spices, &c. The invention consists in having the rotary grinder provided with two grinding surfaces, one at each side; one grinding surface having finer cutting edges than the other, and using in connection with the grinder, thus constructed, an adjustable plate or valve, arranged in such a manner that it may be so adjusted to admit of either side of the grinder being used as desired, or both used simultaneously.]

37,359.—Window Clothes-dryer.—Wesley Powers, Preston, N. Y. :

I claim, first, the arrangement of a swivel bar, A, secured by means of gudgeons, a a′, to the casing of a window in combination with sliding arms, C, provided with lines, e, all constructed and operating substantially in the manner and for the purpose herein shown and described.

Second, The combination and arrangement of the swivel bar, A, line-carrying arms, C, and extension bar, B, as and for the purpose specified.

Third, The arrangement and combination of the swivel bars, A, line-carrying arms, C, and movable stop, g, as and for the purpose set forth.

[This invention consists in the arrangement of a vertical swivel bar provided at its ends with gudgeons which fit into sockets, one in the window sill and the other in a crossbar secured in the casing of the window, in combination with a series of arms having lines attached to them and fitting into mortises in the swivel bar, in such a manner that said arms, together with the lines attached to them, can be driven in one after the other by revolving the swivel bar, and when the clothes are hung on the lines, pushed out again, and thus the hanging up of the clothes can all be accomplished, or nearly all, inside the room or house and without the necessity of extending the arms or any other part of the body out of the window.]

37,360.—Lead Pencil.—Joseph Reckendorfer, New York City :

I claim the new article of manufacture herein described, viz., a wood-cased black-lead pencil, having different grades of hardness at the opposite ends, and indicating on its exterior the character and the amount remaining of each grade, substantially as above set forth.

37,361.—Projectile for Ordnance.—Michael Ritner, of Vincennes, Ind. :

I claim the combination of a leaden ordnance projectile with a vulcanized india-rubber or vulcanized gutta-percha or a combination of vulcanized india-rubber and vulcanized gutta-percha wad or sabot, for the purpose set forth.

37,362.—Grain Separator.—Henry Siddall, San Francisco, Cal. :

First, I claim the spout, A, providing with distributing spouts, B, as described.

Second, I claim spouts, A C, relatively to blast spouts, F, when constructed and operating as described, for the purpose set forth.

Third, I claim the arrangement of chamber, I, spout, K, and elevator, W X, for the purpose of returning a part of the grain, as herein set forth and described.

37,363.—Beehive.—J. W. Smith, Iowa Point, Kansas :

I claim a metallic platform, G, provided with a chamber, d, in which is placed salt or its equivalent, for the purposes set forth.

I also claim in combination with the platform so constructed, the chamfered beehive covered with zinc or other metal, as described, for the purposes set forth.

I further claim coating the inside of the hive with a mixture of red oxide of mercury and beeswax, for the purpose described.

And, lastly, I claim the combination of the perforated slide, G, with the avenue, I, for the purposes described.

37,364.—Operating Ordnance.—E. A. Stevens, Hoboken, N. J. :

First, I claim so depressing the muzzle of a gun that it may be loaded from beneath the plane on which it is placed, through an aperture, I, in the floor or deck, in the manner and for the purpose substantially as set forth.

Second, The use of a steam cylinder, J, for loading and sponging a gun, substantially as described.

Third, The employment, in combination with a rammer, L, operated by steam power, of a mechanical contrivance, O o, substantially as described, for raising the charge and presenting it between the rammer and the muzzle of the gun.

Fourth, The use of a steam cylinder for elevating the charge, substantially in the manner explained.

Fifth, The employment, in combination with means for loading a gun by steam power, of means for injecting water into the bore, substantially as described.

37,365.—Sighting Guns.—E. A. Stevens, Hoboken, N. J. :

I claim, first, The use of a graduated index plate, situated between the gun deck, for pointing the guns of war vessels, substantially as described.

Second, The use of graduated index plates for turning the guns of war vessels, in combination with two screw propellers for turning war vessels, for the purpose specified.

Third, A telescope, F f, constructed substantially as described, in combination with a revolving gun carriage, for the objects specified.

Fourth, The use of two telescopes, constructed substantially as described, for observing from within or below a protected structure, the distance and position of an object, for the purpose specified.

37,366.—Mode of Attaching Chimneys to Lamps.—H. H. Swift, Hart's Village, N. Y. :

I claim the spring, E, bent or curved in bow form, and applied to the burner, A, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a simple and efficient fastening for securing chimneys to lamp burners, one which will yield or give as the chimney expands under the heat from the flame, so as to prevent the chimney from fracturing, and one also which will admit of the chimney being readily adjusted to the burner and detached therefrom.]

37,367.—Shaker Frame for Thrashing Machines.—L. P. Teed, White Deer Mills, Pa. :

I claim a shaker frame having inclined slats, E, and forked rods, d d, arranged and operating substantially as and for the purpose herein set forth.

37,368.—Machine for Rolling and Forging Metals.—Samuel Vanstone, Providence, R. I. :

I claim, first, The combination and arrangement, as set forth, of the two shaping rollers, B B′, and the rolling rest or anvil roller, D, in connection with a suitable device for holding the metal while it is being rolled, substantially as herein shown and described, for the purpose specified.

Second, In combination with such arrangement of rollers, a suitable hammer for welding and assisting in shaping that portion of the metal which is being rolled, so that the metal may be rolled and hammered at the same time, substantially as herein specified.

Third, I claim the construction and arrangement of the clamping disks, J J, substantially as described for the purpose specified.

37,369.—Breech-loading Fire-arm.—G. W. White, New York City :

I claim, first, The method of closing the bore by means of the breech piece, constructed and operated substantially as set forth.

Second, I claim the manner of giving to the breech-piece the two motions described, that is to say, the combination of the said piece with the rotating cylinder by the pin, h, substantially as set fo

37,370.—Hay and Cotton Press.—H. A. Ashley (assignor to Wm. Ridenour and M. K. Biser), Springfield, Ohio :

I claim the arrangement of windlasses, J J′, lever, K, pinions, I I′, spur wheel, H, and cords, L L, attached or connected respectively to the toggle, M N, and directly to the pistons, in the manner and for the objects stated, when combined with hooks, F F′, hinged to each other and to the frame and adapted to open and close both doors, E E′′, at once, in the manner set forth.

37,371.—Harvester.—E. T. Ford, Stillwater, N. Y., assignor to W. A. Wood, Hoosick Falls, N. Y. :

I claim an independent yoke or seat and tongue plate, cast in one piece, and hinged to the main axle, in the manner and for the purpose substantially as described.

37,372.—Fence.—James Hatfield, Ogden, Ind., assignor to himself and John Wall, Falmouth, Ind. :

I claim the manner of keying the posts to the foot stays or braces by means of the two bottom boards of each panel, as shown and described.

37,373.—Tinned Iron Spoons.—R. B. Perkins (assignor to Parker & Perkins), Meriden, Conn. :

I claim joining the handle and bowl of an iron spoon together, in the manner specifically as set forth herein.

37,374.—Hoop Skirt.—S. S. Sherwood, Acquackanock, N. J., assignor to himself and Alexander Douglass, English Neighborhood, N. J. :

I claim the mortised clasp, constructed as described, in combination with the tapes and loops of the lady's skirt, substantially as set forth.

37,375.—Water Elevator.—J. E. Sturdy (assignor to himself and C. A. Smith), Augusta, Maine :

First, I claim the attaching of the spout, I, to the bucket, D, substantially as shown, in combination with a lever, H, and valve, G, all arranged in the manner shown, so that said spout may be tilted at the proper time, and the valve raised in order to admit of the water being discharged from the bucket, as described.

Second, The cam, N, and lips, h h, attached to the bucket, D, in combination with the pendent plate, O, attached to the rising and falling bar, L, arranged to operate as and for the purpose specified.

[This invention relates to an improved water-elevating device of that class designed for household use and in which a bucket and windlass are employed.]

37,376.—Breech-loading Fire-arm.—LeRoy S. White, Waterbury, Conn., assignor to himself and H. A. Chapin, Bridgeport, Conn. :

I claim, first, So constructing the sliding breech-piece, C, and combining it with a non-sliding stock and a non-sliding barrel, that its main or body portion is suspended in a space, without being supported by guides or ways, while its front portion, d, and its rear portion, e, are supported by guides. The said rear and front portions, d e, being solid with the body portion, substantially as and for the purpose described.

Second, The combination of the breech-piece, C, when made with the parts, d e, solid to it, and the horizontal guides, m n c, lever guard, G, link, H, non-sliding barrel, A, non-sliding stock, B, the whole constructed and operating as described.

Third, The combination of the shoulder, p, link, H, lever guard, G breech-piece, C d e, stock, B B′ B2 B3, and play-hole, q′, all substantially in the manner and for the purpose described.

Fourth, The combination of the spring guard, G, link, H, breech piece, C d e, stock, B B′ B2 B3, and the pins, q q2 q3, arranged so that they are out of line when the guard is closed, all substantially as and for the purpose set forth.

Fifth, So arranging the dovetail guide, m, that it serves the double function of keeping the mainspring in place and of holding the tail, e, of the breech piece, G, in position, substantially as described.

Sixth, The combination of the hammer, D, and its actuating mechanism with the sliding breech piece, C d e, non-sliding barrel and non-sliding stock, all in the manner herein described.

37,377.—Apparatus for the Manufacture of Tubes, Pipes, &c.—Benjamin Rhodes, Old Ford Road, Bow, England, assignor to James McGeary, Salem, Mass. Patented in England, April 19, 1862 :

I claim, first, The general construction and arrangement of parts of the machinery or apparatus herein described and as shown in the accompanying drawings, for the purposes set forth.

Second, The use or employment of a perforated cylinder or roller, or a cylinder composed of wire gauze covering revolving in a bath of bitumen, or its equivalent, for the purpose of insuring the more thorough saturation and coating of the material employed for forming pipes.

Third, The use or employment of cold water circulating through the top pressure roller and the cooling and polishing cylinder of pipe-making machines.

RE-ISSUES.

1,369.—Fabric for Roofing, Belting, &c.—The American Waterproof Fabric Company, New York City, assignees through mesne assignments of J. B. Wauds, Memphis, Tenn. Patented July 31, 1860 :

I claim, as a new article of manufacture, the within described flexible fabric, composed of canvas or other fibrous goods saturated with the residuary gum of stearic acid, as herein set forth.

1,370.—Stand for Machines.—W. B. Bement, Philadelphia, Pa. Patented June 3, 1862 :

I claim constructing the stands, frames or main supporting structures of machines, so that closets or tool receptacles shall be formed therein by casting the said stands, frames, or supporting structures, hollow and in one piece, essentially in the manner described.

1,371.—Railroad Car Spring.—A. B. Davis, Philadelphia, Pa. Patented Feb. 15, 1859 :

I claim a box, A, of any suitable form, and the plate, C, or its equivalent, adapted to the open end of the said box and connected to the latter by a bolt or bolts, D, or other suitable fastening, in combination with one or more plates, H, separating from each other two or more nests of springs, the whole being constructed substantially as and for the purpose herein set forth.

1,372.—Railroad Car Spring.—A. B. Davis, Philadelphia Pa. Patented Feb. 15, 1859 :

I claim a box, A, of any suitable form, and a plate, C, or its equivalent, adapted to the open end of the said box, and connected to the latter by a bolt or bolts, D, or other suitable fastenings, substantially as set forth, in combination with a series or nest of springs arranged side by side, and free from contact with each other, each spring forming an integral part of the entire elastic medium composed of the whole of the springs, and the latter serving, with the said box and plate, to constitute an entire single self-contained car spring, as described.

1,373.—Coal-oil Lamp.—W. O. B. Merrill, Philadelphia, Pa. Patented June 10, 1862 :

I claim two inclined or curved plates, d and d′, of a length greater than the width of the wick tube, the said plates being disconnected from each other at the opposite ends, and being otherwise arranged in respect to the wick tube and wick, essentially as and for the purpose herein set forth.

1,374.—Lantern for Coal Oil.—W. H. Racey (assignee through mesne assignments of Max Miller), New York City. Patented Aug. 17, 1858 :

I claim the combination with the cylinder or protector, C, of the in-

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verted cup, H, or its equivalent device, substantially as and for the purpose herein shown and described.

The combination with the protector or cylinder, C, of the tube, G, substantially in the manner and for the purpose herein shown and described.

[The object of this invention is to dispense with the usual draught chimney, which has been hitherto necessarily used in lanterns for burning coal oil, by so constructing and arranging certain parts that the usual glass globe or cylinder, which has hitherto only served to protect the flame, will serve the double purpose of protection and draught creator, whereby a more even and steady flame than usual may be obtained. The invention is not only applicable to lanterns but also to all lamps which are used with a globe, jacket or case, constructed wholly or partially of glass to preserve the flame from external disturbing causes.]

1,375.—Valve for Water Closets.—George Stevenson (assignee of J. E. Boyle), New York City. Patented Jan. 3, 1860:

I claim the valve and its appendages, or the equivalent of them, whose mode of operation is to close the water ways by the pressure of the supply water only, substantially as described, in combination with the means herein described, or the equivalent thereof, for governing the closing of the valve, so that the water shall flow through to wash the pan before the water ways are closed, substantially as described.

1,376.—Grain-dryer.—M. C. Cogswell and A. G. Williams, Buffalo, N. Y. Patented February 18, 1862:

We claim an external stationary case or shell, A, for the purpose of drying grain, having an opening, a', at the top for the reception of the grain and the escape of moisture, dust and chaff; and openings, doors or valves, a2, at the bottom, for the discharge of the grain when sufficiently dry, substantially as described.

1,377.—Grain-dryer.—M. C. Cogswell and A. G. Williams, Buffalo, N. Y. Patented February 18, 1862:

We claim the double head, c, having an air chamber, c', and hollow journal, D, for the purposes and substantially as herein described.

1,378.—Grain-dryer.—M. C. Cogswell and A. G. Williams, Buffalo, N. Y. Patented February 18, 1862:

We claim a series of buckets, so placed and used as to revolve in close proximity to the inner circumference of an external shell into which a blast of air is admitted for drying grain, so that the said buckets will dip up and lift the grain from the bottom of the case and drop it down again in showers, thereby constantly intermingling it with the blast of air, for the purposes and substantially as described.

1,379.—Grain-dryer.—M. C. Cogswell and A. G. Williams, Buffalo, N. Y. Patented February 18, 1862:

We claim distributing air-pipes, one or more, so arranged and used as to revolve within an external case, and in the midst of the moving and showering grain, for the purposes set forth.

1,380.—Machinery for Grinding Paper Pulp.—Joseph Kingsland, Jr., Franklin, N. J. Patented December 16, 1856. Re-issued June 28, 1859:

I claim the combination of a rotating nut, armed with blades suitable for reducing fibrous substance to pulp, a reservoir for containing fibers and water, and surrounding and enclosing the nut with its blades, a feeding aperture through which the fibrous substance and water is to be introduced into the reservoir, a discharge aperture to permit the escape of the water from the reservoir with the fibers when properly reduced, and to check the discharge that the fibers may be retained under the beating action until properly reduced, and the means for inducing a current through the reservoir, the whole having a mode of operation substantially as herein described and for the purpose specified.

1,381.—Process of Grinding Paper Pulp.—Joseph Kingsland, Jr., Franklin, N. J. Patented December 23, 1856. Re-issued June 28, 1859:

I claim the process, substantially as herein described, of reducing fibres to pulp for the manufacture of paper, which process consists in causing the water in which the fibers to be reduced are suspended, to pass in a current into, through, and out of a reservoir enclosing the beaters, and provided with a feeding in and a discharge aperture, so that the fibers shall be retained within the said reservoir, and under the action of the blades or beaters until they are sufficiently reduced, and then follow the current of water to the discharge aperture, substantially as and for the purpose specified.

1,382.—Machine for Lasting Boots and Shoes.—G. B. Martin, Danvers, Mass.; William Wells, Boston, Mass.; and Robert Millard, Poughkeesie, N. Y., assignees of James Purinton, Jr., Lynn, Mass. Patented October 4, 1859:

We claim, first, Compressing the upper around the last by means of clamps, provided with projecting plates or flanges to turn the projecting edges of the upper over upon the insole or last in any manner, substantially as described.

Second, In combination with any suitable device for holding and supporting the last is claimed the use of a series of clamps moved inward simultaneously by levers or their mechanical equivalents to compress the upper upon the last, equally on all sides, substantially as hereinbefore explained.

Third, The hinged or folding plate, C, employed in connection with the clamps, A, substantially in the manner described.

Fourth, The cutting or roughening plate, E, constructed and operating substantially as and for the purposes set forth.

1,383.—Construction of Powder Kegs.—James Wilson, Charles Green and William Wilson, Jr., Wilmington, Del. Patented July 12, 1859:

We claim making one or both heads of the keg with the shoulder, n, and flange, m, and using a mandrel upon said shoulder, n, in order to seam one or both heads to the keg.

1,384.—Washing and Wringing Machine.—John Young, West Galway, N. Y. Patented September 19, 1848. Re-issued July 30, 1861, and extended:

I claim the pressure rollers in combination with the hinged platform, operating as described for the purpose set forth.

Second, The conical rollers for producing a rubbing as well as a squeezing action upon the clothes, as described.

1,385.—Washing and Wringing Machine.—John Young, West Galway, N. Y. Patented September 19, 1848. Re-issued July 30, 1861, and extended.

I claim the application of india-rubber or other elastic gum impervious to water, substantially in the manner and for the purposes described, to the rolls of machines for washing and squeezing clothes.

EXTENSION.

6,025.—Knitting Needle.—James Hibbert, late of Providence, R. I. (Peleg Hull, administrator.) Patented January 9, 1849:

I claim the application of a latch or tongue applied to the hook of the needle, and operated as herein described.

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The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row New York.

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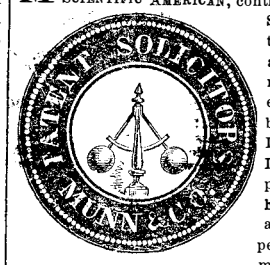

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Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

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Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

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Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Notes and Queries

M. C. B., of Ill.—Mortar should be made for some weeks before it is applied, and when required for use should be thoroughly worked with some fresh mortar. The quantity of sand suitable to mix with a certain amount of lime differs according to the quality of the lime. A certain quantity of hair should be mixed with all the plaster used for the first and second coats in the rooms of houses. Sharp quartzose sand is preferred for mixing with lime. Alluvial soil should never be mixed with mortar. To every bushel of lime made into paste by water about two and a half bushels of sand are used in this section. Shell lime should never be employed to plaster walls as it always becomes moist in wet weather. Perhaps the sand in your section of Illinois should be washed to free it from impurities before it is mixed with lime.

D. L., of Ill.—Melite is sometimes sold for amber, but it is infusible by heat and burns white, while amber burns and falls in liquified drops. Perhaps the sample which you obtained for amber was melite. There are two methods of making amber varnish. One is to distill it, and use its products of distillation to mix with boiled linseed oil and turpentine. The other method is to fuse the amber in the same manner that copal varnish is made, and add one gallon of clarified linseed oil to every three pounds of amber, then boil until it becomes stringy, when it is cooled and thinned with turpentine. It is said to be the best varnish for violins. In alluding to articles which have appeared in the SCIENTIFIC AMERICAN our correspondents will save us a great deal of trouble if they will state the numbers of the pages on which the articles may be found. It takes a great deal of our time to look them up.

O. W., of Ind.—We have no confidence in what is called bletonism or the art of searching for water with the branch of a tree in the hand. It is pretended that in the hands of some persons the leaves of the branch will move when passed above a situation where water may be found underneath. We have been informed that the large 12-inch gun which was made to take the place of the "Peace-maker" that burst on board the frigate *Princeton*, several years ago, was fabricated at Liverpool, where the Horsfall gun was forged. We do not know where it is now.

G. W. S., of Mo.—The method of measuring distances with a graduated pencil is illustrated and described on page 314, Vol. IV (new series) of the SCIENTIFIC AMERICAN.

E. P., of P.—We have heard much respecting the skill which the Chinese possess in soldering (not welding) cast iron vessels, but some doubt the correctness of such reports. Of the large number of celestials in this city none seem to have adopted the profession of cast-iron tinkers.

N. D. J., of Ill.—Lacquer is made by coloring shellac varnish with turmeric and gumbago. Pale lac varnish is the best for coating bone or gutta-percha, but it is liable to crack. Crystal varnish is made by dissolving white balsam of fir in rectified oil of turpentine. Gum mastic dissolved in alcohol makes a good white varnish. To imitate silvering articles with tin, they should be coated with white glue or size and the powdered tin or tin-foil put on before the glue is quite dry.

J. S. D., of N. H.—We do not know the address of the person in question.

C. P., of N. Y.—Your article on sand has been received and will meet with attention.

A. H. and J. H. B., of Pa.—An inventor has the right to sell a machine before applying for a patent, without invalidating his claim to the patent.

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F. C. K., of N. Y.; M. B. S., of N. Y.; H. W. L., of N. Y.; W. W. S., of N. Y.; A. W. S., of Germany; H. L., of England; P. E. R., of France; C. S. O., of N. H.; B. F. C., of Mass. (2 cases); S. T. S., of Mass.; W. P. W., of N. Y.; H. S. S., of N. Y.; D. M. D., of N. Y.; M. R. S., of N. Y.; O. E., of N. Y.; L. C., of Mass.; C. B., of Maine; S. C., of Conn.; W. A. D., of Ohio; W. S., of Ohio; J. P. W., of N. Y.

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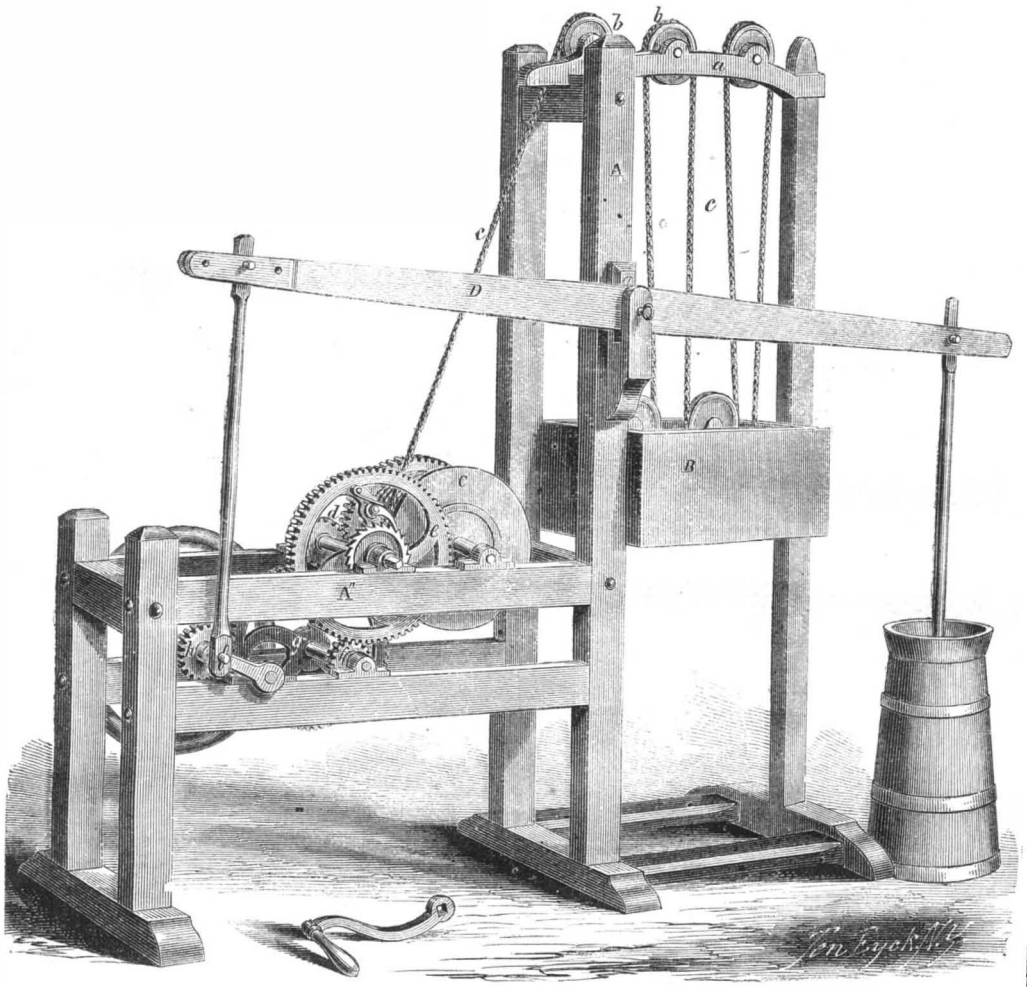
Improved Churn Power.

Churning cream to produce butter, although one of the most interesting of the operations carried on in rural life, viewed in a pastoral sense, is yet a severe tax upon the strength of the operator. It has been the end and aim of inventors to obviate this difficulty by substituting either animal or mechanical means for the purpose. Dogs that grow fat and lazy about the house have had their energies directed to this subject by persons desirous of utilizing their hitherto wasted forces, but as they are unreliable, and usually absent at the time they are most wanted, their employment has not been general. We here illustrate a motive power for driving churns, which we think will be found useful in many cases. It consists of the upright framing, A,



DRAKE'S PATENT CHURN POWER.

to which is attached a transverse bar, *a*, at the top, supporting a number of pulleys, *b*. Over these pulleys the rope, *c*, is carried, and rove through others connected to the box, B, which slides up and down in the frame. In this box are placed the weights which operate through the pulleys just mentioned, on the drum, C. This drum on the frame, A″, has a gear fastened on one of its ends, which engages with the pinion, *d*, on the shaft parallel to the drum. The gear wheel, *e*, on the same shaft as the pinion, meshes into the pinion, *f*, on the lower bar of the frame. This pinion drives the toothed wheel, *g*, which in its turn communicates through still another pinion, *h*, with the crank and connecting rod attached to the horizontal lever, D, at the other end of which is the churn and its dasher. It will be apparent that by winding up the weighted box, B, its gravity will be transmitted through the pulleys to the drum, C, thus furnishing the power that gives the dasher its reciprocating motion.

It is only necessary to wind up the weight by means of the crank, then place the cream in the churn and the machine will work for thirty minutes (long enough to churn a large quantity of cream into butter) without re-winding. This machine will be found to save both time and labor, as it requires no attention save that which can be given by a child.

This machine (the right of which for the State of New York was sold for $6,000) was patented through the Scientific American Patent Agency, July 8th, 1862, by A. Drake. For further particulars address E. D. Cramer, sole agent for Pennsylvania, Ohio, Connecticut, Indiana, Illinois and Kentucky, at Hackettstown, N. J. [See advertisement in another column.]

The New Gun Metal.

A correspondent of the London *Times* communicates some interesting information respecting the new gun metal which is said to have been adapted in Austria for the manufacture of army guns. He states that it is composed of 60 parts copper, 34 parts of spelter, 4 parts of wrought iron and 2 parts of tin. The iron is placed in the crucible first, with the copper upon it, and then exposed to a very high temperature in the furnace; the tin is then added, and when this is melted, the spelter; the whole is stirred thoroughly, then allowed to stand for about two minutes, when it is stirred again and poured out into the mold to form a casting. It is well known that wrought iron does not fuse and become fluid by itself when exposed to a high heat, but it is said to become fluid and diffuses among the melted copper and tin. The *Times* correspondent states that a 12-pounder gun made of this alloy was heavily charged with powder, rammed full with sand, and plugged at the muzzle with a piece of iron, then fired. It did not burst; all the gas resulting from the ignition of the gunpowder escaped through the touch-hole. If such statements are correct, this new alloy is a most valuable discovery for the manufacture of cannon. Experiments should be made at the Ames's Works, Chicopee, Mass. (where bronze guns are constructed), to test the reliability of the assertions respecting the great strength of this new metal.

Waterproof Garden Walks.

The London *Gardeners' Weekly Magazine and Floricultural Cabinet* states that cement walks are becoming common in English gardens. They are made as follows:—Procure a sufficient quantity of the best Portland cement; then turn up the path with a pick, and mix six parts by measure of clean screened gravel with three of sharp sand, and one of the cement; then work them thoroughly with a spade in the dry state. Now add sufficient water to make them into a paste similar to stiff mortar, and lay it down on the walk, on a hard bottom, to a depth of two inches. It is spread with a spade, and the walk made with a slight curve rising in the middle. In 48 hours it becomes as hard as a stone, and not a drop of water will pass through it. Worms will not work through, nor a blade of grass grow upon it.

NEW PROSPECTUS

OF THE

Scientific American.

FOR 1863

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FROM THE STEAM PRESS OF JOHN A GRAY

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